United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Salem District Office
1717 Fabry Road S.E.
Salem, Oregon 97306

IN REPLY REFER TO:
5410 (085) [8/20/03]
Little Boulder Creek Thinning Project
Tract No. 03-302
EA No. OR080-01-16

Dear Reviewer,

The Bureau of Land Management, Marys Peak Resource Area, invites you to review the attached Little Boulder Creek Thinning Project Environmental Assessment and Finding of No Significant Impact. This document describes and analyzes the probable impacts to resources from the proposed project. The proposed project is located in Township 8 South, Range 8 West, Section 11, W. M., in the Upper Siletz Watershed west of Dallas, Oregon. Density management harvest would occur on approximately 179 acres in the Adaptive Management Area and Riparian Reserve land use allocations, using skyline cable and ground based yarding systems. The proposed actions are designed to attain Aquatic Conservation Strategy objectives.

The goals of the project are to implement the recommendations of the ***Upper Siletz Watershed Analysis*** (December 1996) by enhancing structural diversity, and increasing diameter growth to achieve future potential coarse woody debris and instream large wood sources more quickly than under current growth conditions. Other goals of the project are to develop and test new management approaches to achieve ecological and economic health and other social objectives.

We are interested in hearing from you and ask that you provide us with your comments by October 3, 2003. Please respond by then so a final decision can be made on the action. Comments specific to the alternatives and assessment of potential environmental effects would be the most helpful. If you have questions about the environmental assessment, please call Gary Humbard at (503) 315-5981. Please send your written comments to Field Manager, Marys Peak Resource Area, Salem District, Bureau of Land Management, 1717 Fabry Road S.E., Salem, Oregon, 97306.

Sincerely,
Cindy Enstrom
Cindy Enstrom
Field Manager, Marys Peak Resource Area

* Comments, including names and addresses of respondents, will be available for public review at the same time as the EA during regular business hours (7:30 a.m. to 4:00 p.m.) Monday through Friday, except holidays. Individual respondents may request confidentiality. If you wish to withhold your name or street address from public review or from disclosure under the Freedom of Information Act, you must state this prominently at the beginning or your written comment. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be made available for inspection in their entirety.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
SALEM DISTRICT OFFICE
MARYS PEAK RESOURCE AREA

ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT FOR LITTLE BOULDER CREEK THINNING

EA NUMBER: OR-080-01-16
PREPARED BY: Interdisciplinary Team; Gary Humbard, Team Lead
AREA ENVIRONMENTAL COORDINATOR: Carolyn Sands

Summary: This document is an Environmental Assessment and Finding of No Significant Impact for the proposed Little Boulder Creek Thinning, tract number 03-302. The project area is located in Township 8 South, Range 8 West, Section 11 Willamette Meridian, Polk County. The land use allocations are Adaptive Management Area and Riparian Reserve.

Alternative 1, the proposed action, would remove approximately 5,000 thousand board feet (5,000 MBF) from approximately 177 acres of land in accordance with the *Salem District Resource Management Plan* and the *Northwest Forest Plan*. The sale would involve density management in young conifer dominated stands 41 to 62 years old, along with coarse woody debris (CWD) enhancement, road construction (1,000 feet), renovation (4,000 feet), reconstruction (2,900 feet), culvert installations and rock quarry enlargement. Approximately 105 acres of the treatment area would be skyline yarded and 72 acres would be yarded using a ground-based system.

Alternative 2 would be the same as Alternative 1, except approximately 1,000 feet of additional road would be constructed, approximately 1,600 feet of road would not be reconstructed, two culvert installations would not occur, 130 acres of the treatment area would be skyline yarded and 47 acres would be yarded using a ground based system.

Alternative 3 is the "No Action" alternative in which all the proposed treatment would be deferred.

For further information, contact Gary Humbard (503-315-5981), 1717 Fabry Rd. S.E., Salem, Oregon, 97306. Comments on this environmental assessment are due October 3, 2003.

FINDING OF NO SIGNIFICANT IMPACT

Introduction

The Bureau of Land Management (BLM), Marys Peak Resource Area has analyzed the potential effects of a density management, and road management project in the upper drainage (Township 8 South, Range 8 West, Section 11, W. M.). of the Upper Siletz Watershed, Polk County, Oregon. The action described in this environmental assessment (EA) is a density management harvest to enhance habitat within Adaptive Management Area and Riparian Reserves. The action would meet the needs for forest habitat as identified in the *Salem District Record of Decision and Resource Management Plan* (*RMP*, May 1995; see pp. 1 and 2). Riparian Reserves were specifically designated to restore and maintain aquatic ecosystem functions. The EA is attached to and incorporated by reference in this Finding of No Significant Impact (FONSI) determination.

This FONSI and the EA are being made available for public review prior to making a decision on the action. The public notice of availability for review will be published in the *Dallas Itemizer* of general circulation and through notification of interested individuals, organizations, and state and federal agencies. They will also be available for review on the internet at this address: http://www.or.blm.gov/salem/ (planning).

Finding Rationale

Based upon review of the EA and supporting documents, I have determined that the project is not a major federal action and will not significantly affect the quality of the human environment, individually or cumulatively with other actions in the general area. No environmental effects meet the definition of significance in context or intensity as defined in 40 CFR 1508.27 and do not exceed those effects described in the *RMP/FEIS*. Therefore, an environmental impact statement is not needed. This finding is based on the following discussion:

Context. The project is a site-specific action directly involving approximately 187 acres of BLM administered land that by itself does not have international, national, region-wide, or state-wide importance.

Intensity. The following discussion is organized around the Ten Significance Criteria described in 40 CFR 1508.27.

1. **Impacts may be both beneficial and adverse.** Harvested timber would support local mills and the overall economy of the area. In thinning areas, remaining trees would receive more light, water and nutrients and would increase individual tree size more rapidly, contributing to structural diversity. Harvest of partial cut units would alter the characteristics of wildlife habitat. Two permanent roads would be constructed.

Riparian reserve treatments without wood removal would increase structural diversity. Short term, local increases in stream turbidity could occur during timber and mineral hauling (e.g., would only occur during and immediately after hauling and is not likely to be visible or measurable downstream from the project area. None of the environmental effects disclosed above and discussed in detail in Chapter 3 of the EA and associated appendices are considered significant, nor do the effects exceed those described in the *RMP/FEIS*.

2. **The degree to which the selected alternative will affect public health or safety.** Public health and safety were not identified as an issue. The project is comparable to other timber management and riparian treatment projects that have occurred within the Salem District with no unusual health or safety concerns. No hazardous materials or solid waste would be created by the proposed action. Any chemicals or fuel used on the site would be handled according to the best management practices (RMP, Appendix C).

3. **Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farm lands, wetlands, wild and scenic rivers, or ecologically critical areas.** There are no historic or cultural resources, park lands, flood plains, prime farm lands, wild and scenic rivers, or wildernesses located within the project area (EA Appendix B). The sale area has not been designated nor nominated as an Area of Critical Environmental Concern.

4. **The degree to which the effects on the quality of the human environment are likely to be highly controversial.** Scoping of the project resulted in 1 comment letter. The effects of the project on the quality of the human environment were adequately understood by the interdisciplinary team to provide an environmental analysis. A complete disclosure of the predicted effects of the project is contained in Chapter 3 of the EA and associated appendices.

5. **The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.** The project is not unique or unusual. The BLM has experience implementing similar actions in similar areas. The proposed action is local in nature, and potential adverse impacts would be short-term. Impacts were determined based on research, observation, and professional training and experience of the interdisciplinary team of natural resource specialists. There are no predicted effects on the human environment that are considered to be highly uncertain or involve unique or unknown risks.

6. **The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.** The project does not set a precedent for future actions that may have significant effects, nor does it represent a decision in principle about a future consideration. The project presented is typical of previous actions and is completely consistent with established practices fully analyzed within the RMP.

Any future projects will be evaluated through the National Environmental Policy Act (NEPA) process and will stand on their own as to environmental effects.

7. **Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.** The interdisciplinary team evaluated the possible actions in context of past, present and reasonably foreseeable actions. Significant cumulative effects are not predicted. A complete disclosure of the effects of the project is contained in Chapter 3 of the EA. The design features identified in the EA would assure that no significant site-specific or cumulative impacts would occur to the human environment other than those already addressed in the S&M FSEIS, FEIS, and SEIS.

8. **The degree to which the action may adversely affect districts, sites, highways, structures, or other objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.** The project will not adversely affect districts, sites, highways, structures, or other objects listed in or eligible for listing in the National Register of Historic Places, nor will it cause loss or destruction of significant scientific, cultural, or historical resources (EA, Appendix B). No known cultural or paleontological resources occur in the project area. A post-harvest survey would be done upon completion of the project according to *Protocol for Managing Cultural Resources on Lands Administered by the BLM in Oregon*; Appendix D dated August 5, 1998.

9. The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.

ESA Consultation:

Wildlife: The proposed project would not affect suitable habitat for the northern spotted owl or marbled murrelet. However, it was determined that this proposed action "may affect" both of these listed species due to noise disturbance from project activities. To address this concern, consultation has been initiated with the U.S. Fish and Wildlife Service, under the *Programmatic Biological Assessment of Fiscal Year 2003 and 2004 Projects in the North Coast Province which would modify the habitats of bald eagles, northern spotted owls, or marbled murrelets.* A final Biological Opinion was received from the Service on September 30, 2002 (# 1-7-02-F-958), which concluded that the entirety of the planned actions for the fiscal year were not likely to result in jeopardy to these listed species. This Biological Opinion will remain in effect for fiscal year 2003 timber sales. All applicable terms and conditions from the Biological Opinion will be incorporated as design features for this proposed action.

Fish: Consultation with NOAA Fisheries is required for projects that 'may affect' listed species. A determination has been made that this proposed project would have 'no effect' on Coastal Coho (*Oncorhynchus kisutch*). Coastal Coho (*Oncorhynchus kisutch*) are listed as threatened under the Endangered Species Act. Generally, the 'no effect' determination is based on the distance upstream of project activities. The upstream limit of coho salmon distribution is approximately nine miles below the project area in the Mainstem Siletz River at Siletz Falls.

This project will have no effect on listed fish due to the distance to listed fish and project design features that include no harvest activity within stream protection zones and post-project leave tree densities of 34 to 88 trees per acre.

10. **Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.**

The project does not violate any known Federal, State, or local law or requirement imposed for the protection of the environment. State, local, and tribal interests were given the opportunity to participate in the environmental analysis process. Furthermore, the project is consistent with applicable land management plans, policies, and programs. The alternatives are in conformance with the following documents which provide the legal framework for management of BLM lands in the Marys Peak Resource Area: *Implementation of 2001 Survey and Manage Annual Species Review IB#2001-036 and IB#2001-214*, *Implementation of 2002 Survey and Manage Annual Species Review* - IB#2002-033, *Record of Decision and Standards and Guidelines for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (S&M ROD, January 2001) and the *Final Supplemental Environmental Impact Statement For Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (S&M FSEIS, November 2000); *Salem District Record of Decision and Resource Management Plan (RMP,* May 1995); *Salem District Proposed Resource Management Plan/Final Environmental Impact Statement (FEIS,* September 1994*);* and the *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (ROD, April 1994) and the *Final Supplemental Environmental Impact Statement on Management of Habitat for Late Successional Forest Related Species Within the Range of the Northern Spotted Owl* (*SEIS*, February 1994).

The action would be consistent with the Aquatic Conservation Strategy Objectives and promote development of older forest characteristics in the riparian reserves (See Appendix C, Aquatic Conservation Strategy Objectives Review Summary).

In accordance with the RMP (see pp. 21-22), the amount of late-successional forest (i.e., 80 years and older) on federal lands was determined for the Upper Siletz Watershed. The 80+ forest age-classes occur on approximately 18 percent of the federal lands in the Upper Siletz Watershed. This percentage exceeds the RMP standard of 15 percent. No late-successional forest stands would be affected by this action.

The proposed action is within the coastal zone as defined by the Oregon Coastal Management Program. This proposal is consistent with the objectives of the program and the state planning goals which form the foundation for compliance with the requirements of the Coastal Zone Act. Management actions/direction found in the RMP were determined to be consistent with the Oregon Coastal Management Program.

The alternatives are consistent with other federal agency and State of Oregon land use plans and with the Benton County land use plan and zoning ordinances. Any permits associated with the implementation of this project would be obtained, and all requirements would be met. Project design features would assure that potential impacts to water quality from this project would be in compliance with the state of Oregon In-Stream Water Quality Standards and thus the Clean Water Act.

The smoke generated from burning piles would be within the standards set by the Oregon Smoke Management Plan, which considers national air pollution standards and complies with the Clean Air Act.

Cindy Enstrom — 8/27/03

Marys Peak Field Manager — Date

Comments regarding this environmental assessment should be received by the Bureau of Land Management, Marys Peak Resource Area, by October 3, 2003 .

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ENVIRONMENTAL ASSESSMENT

I. PURPOSE AND NEED

A. Introduction

The proposed project is located in the Upper Siletz fifth field watershed and was analyzed in the *Upper Siletz Watershed Analysis (USWA,* December 1996). The document outlined management recommendations for restoring and enhancing ecosystem conditions. The document also recommended density management after specific analysis on stands exhibiting characteristics similar to those in the proposed project area (USWA p. 120-121). The *USWA* also identified a corridor of federal lands that could provide a significant opportunity to promote terrestrial connectivity of older forest habitats within Mill and Rowell Creek watersheds to the east.

B. Purpose and Need

Project 1 (Commercial Thinning and Density Management)

Marys Peak Resource Area staff performed a comprehensive, landscape level analysis to determine relative priority of watershed areas within the Resource Area for ecosystem management. Assessments of watershed, wildlife, silviculture, transportation, and ownership conditions were made in comparison with provincial strategies to identify opportunities and needs and their relative urgency. The upper Siletz watershed emerged as one of the highest priority areas to perform density management of forest stands, improve late successional habitat for marbled murrelet and northern spotted owl, and to improve the watershed and road system.

As a follow up to the findings of the *USWA*, the Marys Peak Resource Area silviculture and wildlife staff began prioritizing areas within the AMA that would benefit from density management and which would contribute to the provincial strategies for recovering AMA conditions across the landscape. Stand exams were completed that focused on managed stands within the *USWA* corridor. The proposed project is intended to implement a subset of specific management opportunities that were identified within the *USWA* and *LSRA* in a manner consistent with standards and guidelines outlined in existing planning documents described below.

1. Enhancing late-successional forest characteristics in relatively uniform dense conifer stands by density management.
2. Creating terrestrial large down wood.
3. Increasing diameter growth to achieve future potential coarse woody debris and instream large wood sources.
4. Testing new management approaches to achieve ecological and economic health and social objectives.
5. Providing a stable timber supply.

Project 2 (Fish habitat enhancement)

The purpose of this project is to promote complex and diverse habitat types for fish in Little Boulder Creek and its tributary adjacent to the eastern boundary of the proposed project area. The majority of current LWD in these streams is older wood. Dropping trees in these streams would add a supply of new wood that would allow habitat types to increase in complexity and diversity.

C. Plan Conformance and Tiering

This environmental assessment (EA) is in conformance with the *Record of Decision and Standards and Guidelines for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (S&M ROD, January 2001); *Final Supplemental Environmental Impact Statement For Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (S&M FSEIS, November 2000). *Implementation of 2001 Survey and Manage Annual Species Review IM#2002-064*, June 2002; and *Implementation of 2002 Survey and Manage Annual Species Review* - IM#2003-050, March 2003;

This EA is also tiered to the *Salem District Record of Decision and Resource Management Plan* (*RMP, May 1995*) *and the Salem District Proposed Resource Management Plan/Final Environmental Impact Statement* (*PRMP/FEIS, September 1994*). The *FEIS* analyzed broad scope issues and impacts within the President's direction to meet the need for forest habitat and forest products (p. 1). The *RMP* provides a comprehensive ecosystem management strategy for BLM-managed lands in the Salem District in strict conformance with the Northwest Forest Plan and the *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (April 1994). All alternatives presented within this EA describe various forest management, road construction, and road decommissioning activities that are in compliance with the *RMP* and *ROD*.

This EA is tiered to the *Western Oregon Program-Management of Competing Vegetation Final Environmental Impact Statement* (VMFEIS, February 1989) and the *Western Oregon Program-Management of Competing Vegetation Record of Decision* (August 1992). The VMFEIS analyzed broad scope issues and impacts for an integrated vegetation management strategy consisting of various treatments. The Record of Decision identifies treatments and provides processes to meet vegetation management objectives (p. 3) and resource management goals (p. 33).

This EA is also tiered to the *Northwest Area Noxious Weed Control Program Final EIS* (USDI, 1985) and the associated *Record of Decision* (USDI, April 7,1986), and the *Supplement to the Northwest Area Noxious Weed Control Program* (USDI, March 1987) and the associated *Record of Decision* (May 5, 1987). This EA will analyze vegetation management treatments such as site preparation and reforestation in the proposed project area.

Additional information about the proposed project is available in the Little Boulder Project EA file.

D. Management Objectives

The following general objectives guided the development of alternatives for this proposed project:

Riparian Reserves (*RMP,* pp. 6-7, 9-15)

Riparian Reserves are a basic component of the Aquatic Conservation Strategy (ACS) designed to work together with Key Watersheds, Watershed Analysis, and Watershed Restoration to maintain and restore the productivity and resilience of riparian and aquatic ecosystems (*RMP* p.6). Riparian Reserves are the portions of the watershed required for maintaining hydrologic, geomorphic, and ecological processes that directly affect streams, stream processes, and fish habitats. They are also designed to provide travel corridors and resources for both riparian dependant and other riparian and/or late-successional associated plants and animals. Management objectives as stated in the *RMP* are to provide habitat for special status, SEIS special attention and other terrestrial species and to meet ACS objectives.

These long-term objectives may be achieved by utilizing silvicultural practices within Riparian Reserves designed to provide specific desired vegetation characteristics needed to attain Aquatic Conservation Strategy objectives (*RMP*, p. 11).

Adaptive Management Area (RMP, p. 19)

Adaptive Management Areas are to be managed to develop and test new management approaches to integrate and achieve ecological and economic health and social objectives. The lands are to contribute substantially to the achievement of SEIS record of decision objectives, including restoration and maintenance of late successional forest habitat outside reserves, consistent with marbled murrelet guidelines, retention of key structural elements of late-successional forests on lands subjected to regeneration harvest; restoration and protection of riparian zones; and provision of a timber supply.

Watershed Objectives

The proposed project is located in the Upper Siletz River fifth field watershed. The watershed was analyzed in the *Upper Siletz Watershed Analysis (USWA)*. The document outlined management recommendations for restoring and enhancing ecosystem conditions. Among these were density management treatment in AMA and Riparian Reserves (p. 121, 126, Map 14) and large woody debris recruitment (p. 125, Map 9).

Aquatic Conservation Strategy objectives (*RMP*, pp. 5-6)

The Aquatic Conservation Strategy as described in the *RMP* (pp. B-9 to B32) outlines several objectives for maintaining and restoring the function of aquatic ecosystems including riparian areas, wetlands, and flood plains. Establishment of Riparian Reserves (*RMP* p. 9-15) and completion of watershed analysis are key components of the Aquatic Conservation Strategy, designed to maintain and restore these unique ecosystems. The *USWA* identified roads within this watershed that could be closed and/or decommissioned to recover hydrologic function and reduce sediment delivery to aquatic systems. The proposed action and all alternatives described in this EA have been designed to be consistent with the guidance outlined in the *USWA* and are intended to contribute to watershed restoration objectives of the ACS. See Appendix C, Aquatic Conservation Strategy Objectives Review Summary.

Wildlife/Fish Habitat (*RMP*, pp. 24-28)

Projects should be designed to enhance and maintain biological diversity conditions for wildlife and should meet Aquatic Conservation Strategy objectives in Riparian Reserves.

Water and Soil Resources (*RMP*, pp. 22-24)

BLM is directed to comply with State of Oregon water quality requirements to restore and maintain water quality and to protect recognized beneficial uses in watersheds, and to improve and/or maintain soil productivity.

Air Quality (*RMP*, p. 22)

BLM is directed to meet "National Ambient Air Quality Standards, Prevention of Significant Deterioration" goals, and the Visibility Protection Plan. In addition, projects must be consistent with the Clean Air Act and State Implementation Plan. Prescribed fire and other fuels management techniques should be used to reduce the potential for wildfire emissions.

Visual Resources (*RMP*, p. 36)

Project area is located within Visual Resource Management Class IV lands which would allow management activities to dominate the view. Manage moderate levels of change to the existing characteristic landscape of the project area.

Rural Interface Areas (*RMP*, p. 39)

The Project area would be outside Rural Interface Areas with the closest residence approximately 12 miles from the project area.

Special Status and SEIS Special Attention Species (*RMP,* pp. 29-31)

Protect, manage and/or conserve habitat for these species so as not elevate their status to any higher level of concern.

E. Scoping and Issues

Efforts to involve the public in planning for the proposed action were as follows:

- The general area was shown as Adaptive Management Area and Riparian Reserve in the Northwest Forest Plan and the RMP. These documents were widely circulated in the state of Oregon and elsewhere, and public review and comment were requested at each step of the planning process.

- A letter was mailed to interested parties on April 17, 2002 requesting initial public input. We received one correspondence letter from the public concerning this letter.

- A description of the proposal was included in the Salem Bureau of Land Management *Project Update* and mailed in September 2001, April 2002, July 2002 and March 2003 to more than 1200 individuals and organizations on the mailing list.

- A former Oregon State University silviculturist (Bill Emmingham) provided input for the development of the density management treatments.

Issues

One issue was identified for project 1 as a result of scoping and the preliminary analysis.

Issue 1. Water Quality (Applies to Project 1)

Some members of the IDT expressed concerns about adverse effects on water quality due to two culvert installations within two streams (1 intermittent, 1 ephemeral) adjacent to Unit 11A.

Alternative 2 was developed to eliminate two culvert installations and subsequently reduce potential adverse effects on water as compared to the design features and mitigation measures incorporated into Alternative 1, the Proposed Action. Design features and mitigation measures to protect water quality are incorporated into Alternatives 1 and 2 and are described in Chapter II. Effects to Water Quality are described in Chapter III.

II. ALTERNATIVES, INCLUDING THE PROPOSED ACTION

A. INTRODUCTION

This section describes alternatives identified by the interdisciplinary (ID) team that helped develop the Little Boulder Creek Project. Forest management treatments incorporated in the proposed action conform to the standard practices and design features intended to reduce the environmental effects of timber harvest and related activities. They comply with the Standards and Guidelines specified in Appendix A of the ROD, and Best Management Practices (RMP, Appendix C).

B. ALTERNATIVES ANALYZED IN DETAIL

Alternative 1: Proposed Action

Project 1 (Density Management)

The intent of the proposed action is to enhance late-successional forest characteristics in relatively uniform dense managed conifer stands by density management, minimize the level of dwarf mistletoe within Unit 11A to retain silvicultural options and to cause little loss during the rotation, and road improvement to improve short term hydrologic recovery. The proposed project area is located in Section 11 of T. 8 S., R. 8 W., (see Appendix A) in the Upper Siletz River watershed and would incorporate the following activities:

- Employ a density management treatment and a combination of skyline and ground-based yarding to harvest approximately 4,000 thousand board feet (MBF) of timber in 6 units, totaling approximately 179 acres. Some stand structural diversity such as existing snags and coarse woody debris would be retained.

- Road construction, renovation, and reconstruction as displayed in Table 2**.**

  - Approximately 1,000 feet of new road construction (Roads P1 and P2), located on a ridgetop, would be constructed and surfaced with crushed rock.

  - Approximately 2,900 feet of existing roads (R1 and R2) would be reconstructed. This work would include brushing, blading, minimal excavation; crushed rock and two culverts would be installed within streams tributary to Little Boulder Creek on Road R-2.

Project Design Features (Project 1)

Project design features are specific constraints placed on the design and implementation for the purpose of mitigating potential impacts to natural resources. The design features of this proposal are described below. All acres and other numerical units are approximate.

1. Vegetation/Density Management

- Approximately 177 acres of dense conifer stands would be treated in 6 separate units. Density management would be accomplished by selectively cutting Douglas-fir, noble fir and western hemlock, with diameters that fall within limits and/or which would retain the basal area requirement described for each unit in Table 1.

Table 1. Summary of Density Management Treatments for Alternative 1

UNIT	AGE	PROPOSED TREATMENT	RELATIVE DENSITY (RD)[1]		TOTAL TREES/ ACRE	PERCENT SPECIES	AVG. DBH (INCHES)	PERCENT CROWN RATIO	PERCENT CANOPY[2]	BASAL AREA (SQ. FT)
11A (Scenario 4)	41	Cut less than 13.1" DBHOB	Current Condition	.85	321	DF 55 WH 36 NF 9	11.7	22	68	259
			After Treatment	.37	88	DF 55 WH 25 NF 20	16.0	36		127
11A (Scenario 2)	41	Cut to BA 90-130 sq. ft.	Current Condition	.85	321	DF 55 WH 36 NF 9	11.7	22	68	259
			After Treatment	.32	70	DF 67 WH 17 NF 16	16.7	37		110
11B	61	Cut less than 22.1" DBHOB" Douglas-Fir (DF) only, Cut greater than 13.1" DBHOB and less than 22.1" DBHOB western hemlock (WH) only, Cut less than 26.1" DBHOB noble fir (NF) only.	Current Condition	.82	139	DF 48 WH 37 NF 15	19.3	30	61	307
			After Treatment	.41	55	DF 44 WH 36 NF 20	22.1	31		160
			Other methods of treatments include Monte Carlo (dice roll by species) and Intuitive (BA 100-220) (see Silviculture Prescription in NEPA file)							
11C	62	Cut to BA 130 to 170 sq.ft. 3 total patch cuts of ½, ¾ and 1 acre respectively.	Current Condition	.89	168	DF 69 WH 23 red alder (RA) 7	18.0	31	65	323
			After Treatment	.37	47	DF 70 WH 15 NF 15	24.2	38		150
11C	62	Cut to BA 110 to 140 sq.ft.	Current Condition	.89	168	DF 69 WH 23 RA 7	18.0	31	65	323
			After Treatment	.29	34	DF 71 WH 9 NF 20	25.3	40		120

UNIT	AGE	PROPOSED TREATMENT	RELATIVE DENSITY (RD)[1]		TOTAL TREES/ ACRE	PERCENT SPECIES	AVG. DBH (INCHES)	PERCENT CROWN RATIO	PERCENT CANOPY[2]	BASAL AREA (SQ. FT)
11D	60	Cut less than 21.1"DBHOB DF & NF only; Cut greater than 10.1" DBHOB and less than 21.1" DBHOB WH only	Current Condition	.74	155	DF 55 WH 36 NF 9	16.7	38	66	265
			After Treatment	.34	48	DF 61 WH 17 NF 22	21.5	39		134
11E	61	Cut less than 16.1"DBHOB all species	Current Condition	.86	228	DF 64 WH 23 NF 13	14.8	36	75	287
			After Treatment	.39	75	DF 56 WH 14 NF 30	18.4	41		140
11F	65	Cut to BA 145 to 185 sq.ft	Current Condition	1.1	265	DF 45 WH 49 NF 6	14.9	29	72	370
			After Treatment	.42	60	DF 70 WH 25 NF 5	22.4	38		165

1. RD (relative density) is a ratio: trees per acre in a stand adjusted to a 10 inch diameter, divided by the number of trees per acre in a fully stocked stand 10 inches in diameter (595 for DF). 0.35 is the point where growth slows from competition. 0.6 is the point where competition begins to cause mortality.
2. Percent canopy is not predicted by Organon, but we expect canopy closure over the treatment area to exceed 40 percent.
3. DBHOB (Diameter Breast Height Outside Bark)

- Density management would be accomplished on approximately 40 acres (Unit 11B) by implementing an array of techniques including but not limited to the following:
  - Strict diameter cut limit where no deviation would be allowed.
  - Intuitive method in which trees designated for retention in the field would meet targeted stand characteristics.
  - Monte Carlo (method in which retention of trees would be determined by mathematical proportion) (see Silviculture Prescription in project folder)).
- Some areas of conifer regeneration would be released using the following design features:
  - Overstory conifers in Unit 11C would be cut around existing conifer regeneration to allow approximately 60 percent of total potential light to reach each released tree crown.

- Only conifer regeneration which indicates a good chance for survival would be released.

- Approximately eight trees selected for their superior genetic quality would be protected, by reserving adjacent trees around them.

- Approximately six noble fir trees selected for their superior genetic quality by the Northwest Christmas Tree Association would be reserved.

- Some trees with desirable wildlife characteristics such as broken tops, forks, deformities, etc. would be reserved to enhance structural diversity. All conifer species other than Douglas-fir, noble fir and western hemlock would be reserved to enhance species diversity, except in rights-of-way, yarding corridors and for safety considerations.

- Some conifers within the diameter limit would be reserved from felling to retain their unique structure and/or benefit to wildlife. Also, some conifers having a DBH above the diameter limit would be designated for felling to achieve desired stand density and to provide release of adjacent dominant individual conifers. Trees designated for reserve are expected to balance trees designated for felling, such that the desired residual stand density (from Table 1) is achieved on a per treatment unit basis.

- All trees infected with dwarf mistletoe in the mid or upper crown and bole located in the eastern portion (see Map A-4, scenario 2) of Unit 11A would be removed. Douglas fir and secondarily noble fir would be retained where dwarf mistletoe is present.

- Approximately 50 percent of trees infected with dwarf mistletoe in the mid or upper crown and bole located on the western portion (see Map A-4, scenario 4) in Unit 11A would be removed. Retain primarily Douglas fir and secondarily noble fir where dwarf mistletoe is present.

- In Unit 11A, all Douglas-fir trees within 50 feet radius of laminated root rot pockets would be removed. Openings created by laminated root rot removal would be planted with conifers such as western hemlock, noble fir and western red cedar.

- All hardwood species would be reserved, unless felling these trees is needed for operability or safety considerations.

- Openings larger than .25 acres would not be created within 100 feet of streams.

- If sufficient funding is available, upon completion of the timber sale, approximately 4 trees per 1,000 feet of stream along Little Boulder Creek and its tributary adjacent to the eastern boundary of the proposed project area would be felled. Trees of average stand diameter or larger would be felled into the stream from within stream protection zones.

- Up to 15-20 percent of the treatment area would be thinned to a wider spacing or have openings that are 0.25 to 1.0 acre in size.

- Openings created by density management within Riparian Reserve would be planted with shade tolerant conifers such as western hemlock and western red cedar.

- Understory conifers less than 6.0 inches would be retained where possible.

- Management of Survey and Manage Species found as a result of inventories would be accomplished in accordance with the *Record of Decision and Standards and Guidelines for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (S&M ROD, January 2001) and the *Final Supplemental Environmental Impact Statement For Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (S&M FSEIS, November 2000) and 2001 and 2002 annual species reviews, BLM Information Bulletin No. OR-2002-033.

- Management of all survey and manage known sites located within the proposed project area would be accomplished in accordance with management direction listed on pages 8 through 14 of the standards and guidelines S&M ROD, January 2001. All of the known sites would be withdrawn from any timber harvesting activity which would minimize any soil disturbance and protect the known site micro-climate. All known sites including the *Phaeocollybia olivacea* site would be buffered by a 50 foot no ground disturbance buffer. A secondary buffer consisting of an additional 50 feet would maintain a minimum 120 foot basal area and reserve all trees over 20 inches in diameter to protect all known sites. None of the buffers would cross the existing roads to the north or west. *See attached map.*

- All exposed mineral soil areas (roads to be constructed, cat/skid roads, landings) would be grass seeded with Oregon Certified (Blue tagged) red fescue (*Festuca rubra*) as a rate equal to 40 pounds per acre.

2. Wildlife

- Harvest operations and associated activities would be conducted in conformance with the applicable Biological Opinion (# 1-7-02-F-958) concerning listed wildlife species. Pertinent Terms and Conditions for this BO include:

  - A daily use restriction on the operation of mechanized equipment would be required from April 1 through September 15, where equipment use would be restricted to the time period beginning two hours after sunrise and ending two hours before sunset within all units;

  - No blasting would occur on any units during the time period January 1 through September 30, unless authorized upon completion of a reinitiated consultation;

  - The Resource Area Biologist would be notified if any federally listed wildlife species are found occupying stands proposed for treatment during project activities.

- All existing down logs and snags would be retained except where they pose a safety risk or affect access and operability. Any snags or logs felled or moved for these purposes would remain on site within the project area.

- When selecting trees for removal that occur in tight clumps of two or more trees the following criteria would be considered when selecting trees to be reserved: The priority species to retain would be 1) Douglas-fir, 2) noble fir and 3) western hemlock. Douglas-fir provides superior structural complexity for wildlife habitat when compared to noble fir and western hemlock.

- At least two green trees per acre intended to be part of the residual stand would be retained on site following harvest operations. These trees would consist of the largest diameter trees which must be cut for safety reasons or to facilitate access and operability (yarding corridors, tailholds).

- Some of the open-grown Douglas-fir "wolf trees" and largest diameter Douglas-fir in all units would be reserved for future wildlife trees, snags, and coarse woody debris.

- Some of the largest diameter, most structurally complex western hemlock trees that are infected with dwarf mistletoe would be retained since these trees could provide excellent wildlife nesting opportunities in the future.

3. Yarding

Ground based yarding (approximately 70 acres in Units 11A through 11E)

- Total surface area of landings would be kept to the minimum to accomplish the yarding.

- Harvester/forwarder and/or crawler tractor would use existing skid roads as much as possible.

- Unmerchantable material would be placed in yarding corridors to minimize the need for machines to go on bare soil.

- Yarding with ground-based equipment would be allowed only on slopes less than 35 percent.

- **If harvester/forwarder equipment is used in the ground base yarding area the following conditions would be required:**

  - Harvester/forwarder corridors would be spaced a minimum 60 feet apart and less than 15 feet in width.

  - Logs would be required to be transported free of the ground in the ground-based yarding area. The equipment would be either rubber tired or track-mounted and have rear tires or tracks greater than 18 inches in width.

- Harvester/forwarder equipment would be restricted to periods of low soil moisture (generally July 15 to October 15). Operations may occur outside of these restricted times if all of the following conditions are met:

  - The area is narrow enough to be harvested with one pass of the loaded forwarder, or

  - Machines are kept on areas with heavy slash accumulations in order to distribute the weight over a large area and minimize topsoil disturbance. Placement of additional slash on harvester/forwarder trails would probably be necessary in most cases.

  - The operation is frequently monitored (at least daily) to ensure that significant soil compaction does not occur.

  - Operations are shut down at the first indication of significant soil compaction.

- **If crawler tractor is used in the ground base yarding area the following conditions shall be required:**

  - Crawler tractor equipment would be limited to tractors with a blade less than eight feet in width and tractor must be equipped with an integral arch.

  - All crawler tractor roads would be spaced approximately 150 feet apart and be a maximum of 12 feet in width.

  - Crawler tractor yarding would be restricted to periods of low soil moisture (generally August 1 to October 15). Yarding would be shut down during this period if necessary to avoid excessive soil and water resource impacts. See Appendix H, Summary of Seasonal Restrictions.

  - Equipment would be required to operate on top of slash as much as practical on designated skid roads.

<u>Skyline Yarding (approximately 107 acres, in Units 11A-11F)</u>

- One-end suspension of each log would be required.

- Approximately 15 acres would require multi-span yarding to achieve one-end suspension.

- Yarding corridors would be spaced a minimum of 150 ft apart.

- Yarding would be allowed all year, but may be temporarily stopped due to excessive bark slippage (generally between April 15 and June 15), as determined by the Authorized Officer.

4. Road and Landing Construction, Road Management

- All landings would be constructed to minimal dimensions.

- Road construction would be restricted to periods of low soil moisture, generally between May 1 and October 31.

- The proposed new road construction would be surfaced with aggregate base course in order to extend the season of logging and hauling.

- New culverts installed would meet 100 year flood design criteria. Cut and fill slopes would be grass seeded and riprap would be placed as needed.

- The project would utilize an existing quarry site located north of Unit 11A (see Appendix A). Material from this site would be utilized for road surfacing.

- Timber hauling would be permitted only during periods of dry weather and low soil moisture, generally between April 1 and December 1. All hauling would be restricted at any time of the year if necessary to avoid excessive soil and water resource impacts.

- The clearing limits associated with road construction would be as narrow as practicable to minimize disturbance to soils and vegetation.

- Improvements to existing roads would occur prior to hauling and would be ongoing as needed during hauling. They could include any of the following:

    - Increasing aggregate surface depth where necessary to support haul and reduce sediment discharge into area streams.

    - Avoiding vegetation disturbance within ditches along BLM controlled roads during the life of the sale.

Table 2. Summary of Road Construction and Use for Alternative 1

Road Number	Length (feet)	Road Action	Road Type	Final Status	Remarks
P-1	490	N	Perm	Open	Unit 11C, rocked, ridgetop
P-2	500	N	Perm	Open	Unit 11C, rocked, ridgetop
R-1	1,250	RE	Perm	Open	Unit 11B, rocked
R-2	1,650	RE	Perm	Open	Unit 11A rocked
R-3	500	R	Perm	Open	Accesses existing rock quarry to be enlarged
8-8-11.4	2390	R	Perm	Open	Unit 11A and 11C
8-8-11.3	695	R	Perm	Open	Units 11B and 11C
Road Action: N= new construction, R= renovation, D=decommission, RE=reconstruction **Road Type**: S-P= semi-permanent (temporary road, used more than 1 season), Perm= permanent surface **Final Status**: D= decommissioned.					

5. Soils

- Soils management design features are listed under the Yarding and Roads sections.

- Areas of disturbed soil and waste areas within the culvert installation site would be re-vegetated using the following possible methods:

  - Grass seeding, fertilizing, hydro mulching, netting, mulching, and/or planting native trees or shrubs. Same mixture and rate of grass seed as stated above would be applied.

6. Fuels/Air Quality

- Debris cleared during road construction would be scattered along the length of the rights-of-way. Large accumulations and piles of debris that may later pose higher than necessary fire hazards would be avoided. No debris would be piled against trees or snags.

- Motor vehicle access near harvest areas during the fire season in the first year following harvest activities while fuels are in the "red needle" stage would be restricted if fire season weather and fuel conditions warrant. This would be done in collaboration with ODF and if needed, the roads would be posted with signs restricting entry.

- Debris accumulations on landings and along roads would be machine piled, covered with plastic and burned under favorable smoke dispersal conditions in the fall, in compliance with the Oregon smoke management plan.

- No burning would take place within the Riparian Reserves.

7. Water/Fish/Riparian

- Density management treatments would be applied inside of Riparian Reserves as appropriate for enhancing late-successional forest structure, while avoiding ground disturbance that could impact adjacent water courses. (See Density Management design features, Table 1)

- Stream protection zones (SPZ) would be established along all streams and identified wet areas within the project area. See Appendix F, Criteria for Stream Protection Zones.

- To protect water quality, trees would be felled away from all stream protection zones. Where a cut tree does fall within a stream protection zone, the portion of the tree within the stream protection zone would remain in place.

- Conduct in-stream work between July 1 and August 31, the period recommended by the Oregon Department of Fish and Wildlife.

8. Special Forest Products.

- Special forest product permits for floral greenery, such as Oregon grape, sword-fern, and salal, and transplants such as vine maple, and mushrooms would be available by permit before and after harvest operations as appropriate.

- If firewood is present on the landings after completion of the logging contract, permits may be made available to the public. Prescribed burning would be delayed one or more seasons in order to accommodate firewood cutting.

9. Cultural Resources

- No known cultural or paleontological resources occur in the project area. A post-harvest survey would be done upon completion of the project according to *Protocol for Managing Cultural Resources on Lands Administered by the BLM in Oregon*; Appendix D dated August 5, 1998. If any sites are identified during timber harvesting, the operations would be immediately halted and the Field Manager would be notified. Operations would be resumed only with the Field Manager's approval, and only after appropriate mitigation measures were designed and implemented to provide any needed protection of those resources.

Project 2 (fish habitat enhancement)

The proposed action includes felling approximately 4 trees (less than 28 inch DBHOB) per 1,000 feet into Little Boulder Creek and its tributary adjacent to the east boundary of the project area to enhance fish habitat.

Alternative 2: Reduced Road Reconstruction, Elimination of Culvert Installations and Additional New Road Construction (Applies to Project 1)

The following project design is described for Alternative 2, only where it differs from Alternative 1.

Approximately 1,000 additional feet of new ridgetop road (P3) would be constructed in Unit 11A. Approximately 1,650 feet of reconstruction (R2) and two culvert installations (R2) would not occur. 130 acres of the treatment area would be skyline yarded and 47 acres would be yarded using a ground-based system (see Appendix A3).

Table 6 shows the differences between Alternatives 1 and 2.

Selected Parameters	Alternative 1	Alternative 2
Road Construction (feet)	1,000	2,000
Road Reconstruction (feet)	2,900	1,300
Culvert Installations	2	0
Skyline Acres	107	130
Ground Based Acres	70	47
Total Number of Acres	177	177

Alternative 3: No Action

All proposed treatments would be deferred.

C. ALTERNATIVES CONSIDERED BUT ELIMINATED

- An alternative to decommission approximately 3,000 feet of mid-slope road (portion of Rd. 8-8-12 from beginning of 8-8-11.1 to termini of 8-8-11.1) was considered by the ID team, but eliminated from further analysis for the following reasons:

  - Road 8-8-12 is included within Reciprocal Right-of-Way Agreement S-805 between BLM and Weyerhauser Timber Company (Weyerhauser). Right-of-Way Agreement requires dual consent when change of road status is requested. BLM contacted Weyerhauser for their concurrence in decommissioning the portion of road. Weyerhauser did not agree with the proposal to decommission the road since they plan to use the road for future timber hauling and other vehicle use.

III. DESCRIPTION OF THE AFFECTED ENVIRONMENT/ ENVIRONMENTAL CONSEQUENCES

The following environmental features will be discussed in this chapter.

- Vegetation/Botany: Effects on Special Status Species or SEIS Special Attention Plant Species, the spread of noxious weed species, and long-term forest health and stand biodiversity.
- Soils: Effects on long-term site productivity, surface disturbance and erosion.
- Fuels: Effects on fuel loading, fire risk and air quality.
- Water/Riparian **(Issue)**: Effects on stream flow, channel conditions, water quality, long term in-stream large wood recruitment, and the attainment of Aquatic Conservation Strategy (ACS) objectives. Water Quality was identified as an issue in Chapter 1.
- Wildlife: Effects on wildlife species which BLM, by law and policy, is required to protect, maintain, or recover and their habitats.
- Fisheries: Effects on fisheries and their habitats.

Additional environmental features are discussed in Appendix B. Resource values are not described in this section if there are no anticipated site-specific impacts, site-specific impacts are considered negligible, or the cumulative impacts described in the existing EIS are considered adequate.

A. GENERAL

The proposed project area is located in T. 8 S., R. 8 W., Section 11, W. M., in Polk County. The project area is in the Upper Siletz Watershed. The land use allocations for the project area are Adaptive Management Area and Riparian Reserve.

B. TOPOGRAPHY

The project area is situated primarily on a mid-slope with no distinctive aspect. Elevation varies from 1,700 to 3,300 feet. Slopes range from 0 to 80 percent.

C. VEGETATION

Vegetation: Affected Environment

Structure/Species Composition

The proposed project area is comprised of a coniferous forest within two distinct conifer plant zones. Noble-fir dominates the higher elevation portions of the project area while Douglas-fir is the dominant conifer at lower portions of the project area. Both species are intermixed between the two distinct forest associations.

The stands are relatively young managed stands (ranging in age from 41 to 65 years) logged in

the 1940's and 1950's, composed of Douglas-fir, noble fir and western hemlock. There are hardwoods and some western red cedar, mostly near streams. Two units (11C and 11E) which were commercially thinned approximately 25 years ago have varying amounts of western hemlock understory. The stands are all densely stocked, with relative densities over 0.8 and trees per acre ranging from approximately 140 to 320.

The understory layer is variable in terms of density and species. Many areas, especially areas with larger openings in the canopy are dominated by thickets of rhododendron, vinemaple, red and oval leaf huckleberry. In previously thinned areas western hemlock seedings are more abundant. Other portions of this area have the same species listed above but the understory is fairly open and the shrub species widely spaced. In areas where the canopy cover is high there is no understory. In some areas of a high canopy cover the shrub layer is beginning to die from lack of sunlight.

The shrub and forb layer is variable as well. Some portions of this project area are open and dominated by oxalis or other low growing forbs. Other area have no shrub or forb layer. Yet other portions are dominated by salal, sword-fern and/or Oregon grape. The previously thinned area has an increase in salal and sword-fern and western hemlock seedlings as compared to non-thinned areas.

The major plant grouping as listed in the Salem District Proposed Resource Management Plan/Final Environmental Impact Statement (V.1, chapter 3, pp.29-32) is the Douglas-fir/Red Alder/Salmonberry grouping which occurs on the west slopes of the Oregon Coastal Mountains. This project area falls within two distinct types of plant associations; the Pacific silver fir series and the western hemlock series (see the Botany Report in NEPA file for more specific plant associations).

Special Status and Special Attention Species: Vascular plants, Lichen, Bryophytes, Fungi:

Vascular plants:

Inventory of the project area for survey and manage vascular plant species was accomplished in accordance with the survey protocols as described on page 3 of *Survey Protocols for survey and Manage strategy 2 Vascular Plants*, version 2.0, December 1998. Specific surveys for all listed special status and special attention vascular plant species were accomplished on June 26, July 2, 3, 23, 24 and October 22, 2001.

- Special Status and Special Attention Species: There are no "known sites" of any special status or special attention vascular plant species within the project area nor were any found during subsequent surveys.

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Lichens:

Inventory of the project area for survey and manage lichens were accomplished in accordance with the survey protocols as described within the *Survey Protocols for Component 2 Lichens* version 2.0, March 12, 1998. Inventories for newly assigned lichen species into categories "A" and "C" of the *S& M ROD* that currently have no protocols were surveyed using the intuitive control method. However, pre-disturbance surveys for these species may not be required for up to two years as described on page 23 of the *S&M ROD*. Specific surveys for all listed special status and special attention lichen species were accomplished on June 26, July 2, 3, 23, 24 and October 22, 2001.

- Special Status and Special Attention Species: There are no "known sites" of any special status and special attention lichen species within the project area, nor were any found during subsequent surveys.

Bryophytes:

Inventory of the project area for survey and manage bryophytes were accomplished in accordance with the survey protocols as described in *Survey Protocols For Survey and Manage Component 2 Bryophytes,* version 2.0, December 1997 and *Survey Protocols for Protection Buffer Bryophytes*, version 2.0, December 1999. Specific surveys for all listed special status and special attention bryophyte species were accomplished on June 26, July 2, 3, 23, 24 and October 22, 2001.

- Special Status and Special Attention Species: There are no "known sites" of any special status and special attention bryophyte species within the project area, nor were any found during subsequent surveys.

Fungi:

Inventory of the project area for survey and manage fungi species were accomplished in accordance with the survey protocols as described in *Survey Protocols for (Bridgeoporus nobilissimus) Fungi*, version 2.0, May 1998. Pre-field reviews and field surveys of the project area indicate that suitable habitat for *B. nobilissimus* does exist within or adjacent to the proposed project area. Specific surveys for all listed special status and special attention fungi species were accomplished on June 26, July 2, 3, 23, 24 and October 22, 2001.

- Special Status Species: There are no "known sites" of any special status fungus species within the project area, nor were any found during subsequent surveys.

- Special Attention Species: The following special attention fungi species were located in the proposed project area; *Phaeocollybia fallax* (category D), *P. kauffmanii* (category D) and *P. olivacea* (category F).

Noxious Weeds:

The following noxious weeds are known from within or adjacent the project area, Tansy ragwort (*Senecio jacobaea*), bull and Canadian thistles (*Cirsium vulgare* and *C. arvense*), St. John's wort (*Hypericum perforatum*) and Scot's broom (*Cytisus scoparius*).

Vegetation: Environmental Consequences

Alternative 1 (Proposed Action)

Project 1 (Commercial Thinning and Density Management)

Structure/Species Composition

The proposed action would decrease the existing coniferous canopy cover through thinning. The decrease in the canopy cover would allow for an increased amount of sunlight to reach the understory and forest floor species (shrubs, forbs, ferns and grasses). The increase in sunlight may allow these species to increase in density. Many open slash covered areas could become dominated by shrub and/or fern species. Sunlight would also be increased to the lower parts of the canopy, which may increase the growth rate to the reserved conifers. Eventually it is expected that the canopy cover would increase to 80 percent or to approximately just under the levels prior to thinning.

The stems of the conifers would be removed from site. The tops, branches and broken/shattered stems would remain on site to decay. Some of the broken stems and larger diameter tops would provide habitat for the Douglas-fir bark beetle. In the unlikely event of a large infestation of these beetles, some reserved Douglas-fir trees may be killed in the following 1 to 5 years. If standing trees are killed it would create snags which are valuable for wildlife. Blown-down timber may also occur post harvest in the thinned areas creating additional coarse down woody debris. Blown-down timber may also lead to an increase in the Douglas-fir bark beetle populations. Subsequent infestations are not likely after approximately 5 years.

All existing vegetation in the forested areas where roads are to be constructed would be scraped to mineral soil and a road constructed. These areas would be heavily compacted through the road building and logging operations. Timber yarding operations would also scrape duff and expose mineral soil in areas, especially yarding corridors. Non-native species may become established in any exposed mineral soil areas. These non-native species often persist for several years but soon decline as native vegetation increases within the thinned areas.

Special Status and Special Attention Species: Vascular plants, Lichens, Bryophytes

The proposed action would not affect any special status or special attention vascular plant, lichen and bryophyte species since none were found or are known from the project area.

Special Status and Special Attention Species: Fungi:

- Special Status Species: The proposed action would not affect any special status fungi species since none were found or are known from the project area.

- Special Attention Species: All "known sites" of special attention fungi species are included in the reserves and not included in the harvest areas and all sites would be protected.

Noxious Weeds:

Any ground disturbing activity may lead to an increase in the noxious weeds known from the project area. Known species from the area are priority III noxious weeds and are well established and widespread throughout the Mary's Peak Resource Area and the Salem District. Eradication is not practical using any proposed treatment methods. Grass seeding exposed soil areas tends to abate the establishment of noxious weeds. With the implementation of project design features described in Chapter 2, the risk rating for the long-term establishment of noxious weed species and consequences of adverse effects on this project area are expected to be low.

Effects on Long-Term Forest Health and Biodiversity:

Broken tops and large limbs remaining on site, and an elevated risk of blowdown following harvest may cause an increase in Douglas-fir bark beetle populations for 1 to 3 years following thinning. This could result in scattered mortality of remaining Douglas-fir trees.

Similar projects in the Marys Peak Resource Area have resulted in very little post-harvest bark beetle activity. In general, since thinning increases the vigor of remaining trees, susceptibility of trees to disease and insect agents is decreased. Long-term forest health does not necessarily preclude natural disturbance processes such as occasional windthrow, root diseases, mistletoe, and insect damage, but thinning can increase the resiliency of stands to incorporate disturbance without widespread mortality or decline. A key to long-term forest health is protection of soil nutrient capital. The greatest proportion of nutrients in trees is found in the needles and fine twigs. Larger limbs and boles consist mostly of cellulose, and their decomposition adds structure to the soil, but little nutrient capital. Removal of trees through thinning would have the greatest effect on nutrient capital if trees were whole-tree yarded to the landing. The proposed action is to yard most of the area through skyline yarding, and approximately 11 acres through ground-based harvesting. In both systems, the crowns of harvested trees would remain on site protecting and retaining soil nutrient capital. Other effects on soils are related to long-term forest health, and are discussed in detail in the soils effects section.

Design features to retain trees of conifer species other than Douglas-fir and western hemlock, and to retain hardwood species, would retain tree species diversity. Stands that have been thinned have much greater herbaceous cover than unthinned stands. They also tend to have much greater species richness than stands that have not been thinned. Increased coverage of native plants such as tall shrubs, low shrubs, grasses and sedges, nitrogen-fixing species, and vines can be expected as a result of thinning. Non-native species increase as well.

In general, the only species decreased by thinning are achlorophyllus species (those lacking chlorophyll), such as Indian-pipe, ground cone, and pinesap. Thinning shows variable effects on fungi response. The gaps and tall shrubs fostered by thinning favor the development of lichen and bryophytes. In general, thinning is considered beneficial for biodiversity of plant life, though there may be increases in non-native species, and short-term effects from disturbance.

Maintenance of Stand Stability:

Trees grown in more open conditions become more wind firm than those in very dense stands, both because individual trees experience more wind as they develop and because trees with less competition maintain their live crowns longer, giving them a lower center of gravity and decreasing their height/diameter ratios. Lower live crown ratios indicate a stand is no longer suitable for density management, as the trees would likely not respond to more open conditions, and are more subject to wind throw if the stand is opened up. Some researchers now suggest that wind firmness and individual tree stability are large factors in a tree reaching age 300 and over. Crown ratios of treated stands remain in the high 20's or over 30 percent 30 years from now.

Restored Structural Complexity of the Stands:

The proposed action would increase the amount of light penetrating the canopy. Increased light levels would promote growth and development of vegetation found at mid canopy and ground levels. In the short term a more complex understory would develop consisting of more shrub species, which are important habitat components for aquatic insects, a major food source for fish, amphibians and birds. Understory initiation of shade tolerant conifers associated with canopy layering would be promoted in areas of increased light over the long term. Relative density (RD) is an indicator of mortality from competition and in all units is decreased to 0.4 or below by density management. A lower RD indicates a better chance for understory development. RDs in all units 30 years later are lower for treated stands (Table 3). Trees would be removed in a variable spacing, providing both openings for understory tree and shrub development, and clumps of remaining trees. This would provide habitat for a wider variety of species than a densely spaced uniform stand.

Accelerated Development of Desired Tree Characteristics:

Residual trees would increase in diameter and crown depth/width. Limb diameter on large limby trees would be maintained by releasing those trees to an open grown condition. The long-term results of density management would be larger average DBH and larger crowns (higher crown ratios) at any given age, compared to the no treatment option (Table 3). Diameters 30 years in the future in the treated stands would range from 16 percent to 29 percent larger, (DBH increase is lowest where densities remain highest). Crown ratios, which are indicators of wind firmness and crown depth, would range from 11 percent to 42 percent higher.

Table 3

Comparison of Treatment vs. No Treatment 30 Years in the Future[1]

UNIT	AGE	TREATMENT	AVG DBH	PERCENT CROWN RATIO	RD	TREES/ ACRE	BASAL AREA
11A	71	None	15.2	18	.90	221	308
		Cut to BA 110	22.4	31	.49	69	193
11B	91	None	22.0	23	..90	123	355
		Cut DBH less than 22.1	26.2	28	..51	52	215
11C	92	None	21.1	23	.94	139	365
		Cut to BA 150	28.6	32	.48	46	206
11D	90	None	19.6	29	.84	136	319
		Cut to DBH less than 21.1	26.0	39	.44	46	187
11E	91	None	17.2	27	.97	202	347
		Cut DBH less than 16.1	22.6	35	.53	74	209
11F	95	None	20.6	24	1.0	160	419
		Cut to BA 165	29.4	27	.64	59	280

1. In order to compare results of the proposed treatments versus no treatment, the stands were modeled using Organon, SMC, version 1.0, a growth and yield model developed by OSU. Numbers generated by growth and yield models can be used as a relative comparison of treatments in a given stand, but are not necessarily accurate predictions of future growth. Future stand measurements are dependent on disturbance patterns and other stochastic events that can never be accurately predicted.

Project 2 (Fish habitat enhancement)

The felling of approximately 4 scattered trees per 1,000 feet into Little Boulder Creek and its tributary adjacent to the east boundary of the project area would not alter the amount of light penetrating the canopy enough to increase ground cover or individual tree growth. Douglas-fir bark beetle infestations may occur in the felled trees. Some additional standing, healthy or weakened trees within the project area may be killed in subsequent years by beetle infestations. However, it is not anticipated that any widespread infestation would occur.

Alternative 2 (Reduced Road Reconstruction, Elimination of Culvert Installations and Additional New Road Construction – Applies to Project 1)

Alternative 2 would essentially have the same environmental consequences as alternative 1 on native vegetation. The differences between opening a "healed over" road bed (alternative 1) and new construction would be minimal as both grade the soil surface of native species to approximately the same specifications.

Alternative 2 may provide less soil and ground disturbances (including compaction) as more of the project area would be logged by cable based equipment than by ground based equipment. This may decrease the risk of establishment and spread of non-native vegetation. However, the risk rating for the long-term establishment of noxious weed species and consequences of adverse effects on this project area would still be low.

Alternative 3 (No Action)

Effects on Long-Term Forest Health and Biodiversity:

Tree density and competition would increase, reducing the vigor of all but the most dominant trees in the stand. Trees would eventually die of density-related mortality, and be much more susceptible to insect or disease mortality before that time. Shade-tolerant species would continue to be important stand components, but hardwood trees would likely decline in the long-term due to shading from conifers. Understory shrubs, forbs, grasses and ferns would continue to diminish due to shady conditions. Low light conditions would similarly decrease lichens and bryophytes. Because of the variety of conditions found over the landscape, no species would be lost over the scale of the project area, but many would be at reduced distribution and coverage.

Trees would continue at their present rate of growth, slowing as the canopy closes and competition for light becomes more intense (Table 3). Crown ratios would decrease at a faster rate compared to Alternative 1 thereby reducing large limb growth potential for nesting structure or some habitat features. Wind firmness and individual tree stability would decrease as crown ratios decrease. Risk of catastrophic consequences due to wildfire and windstorms may increase. Densely stocked stands with consequent large numbers of small snags and CWD burn more readily and are more subject to crown fires than stands growing at lower densities. The canopy would remain closed, allowing little light to penetrate to the ground. The relative density (RD) of the stands as modeled in Organon would range from .84 to 1.0 if left untreated for 30 years (Table 4). 0.6 is considered the point where mortality due to competition begins. Therefore it can be concluded that no significant understory would develop within the next 30 years and beyond without density management.

Nutrients would not be removed from the site. Succession would continue without human intervention that could include catastrophic events changing the successional pathway. The canopy in this stand would remain closed until another activity is proposed, or until natural disturbance creates a gap. The number and diversity of understory and shrubs/forbs species in many areas may remain low. Eventually, dominant trees would shade out and kill suppressed and co-dominant trees. This would create additional snags and down woody debris. Blow-down trees may occur in winter storms creating habitat for the Douglas-fir bark beetle that may become established in the dying trees. As openings in the canopy are created additional sunlight would be available to the understory, shrubs and forbs. Additional openings may increase the number and diversity of "botanical and fungal" species in the area. Open areas may become dominated by shrubs (salal) and/or ferns.

The No Action Alternative is not expected to affect special status species, special attention species or noxious weeds.

D. SOILS

Affected Environment

The predominant soil series on and around these sites is: Lurnick gravely loam and Luckimute very shaly loam. Slopes on the skyline yarding areas vary from 35 percent to 70 percent. Slopes on the ground based yarding areas vary from 0 to 35 percent. Moderately compacted soils have persisted in scattered existing skid trails and old haul roads that date back to the original tractor and high lead logging that was done in portions of the site in the late 1930's to 1950's. There is brush growing in some of the trails. The skid trails and old haul roads are generally less than 12 feet in width so the stands are generally fully occupied by tree canopies.

Lurnick soils are moderately deep, well-drained soils formed in residuum and colluvium weathered from sedimentary rock. The surface mineral layer is a very dark grayish brown gravelly silty clay loam about 9 inches thick. The upper 6 inches of the sub-soil is dark-brown gravelly silty clay loam and the lower 15 inches is dark yellowish brown very gravelly silty clay. Fractured silt stone is at a depth of 30 inches.

Lukimute soils are shallow, well-drained, gentle to steep sloping soils that developed from shaly residuum and colluvium weathered from sedimentary rock. The surface layer is a brown very shaly loam about 3 inches thick. The subsoil is brown very shaly loam about 13 inches thick. Fractured shale bedrock is at a depth of approximately 12 to 20 inches.

In general, the soils on the units are 15 to 30 inches thick where they contact fractured bedrock. Rock fragments of varying sizes are common throughout the soil profile. The shallow depth of soil, low water holding capacity and low permeability rate results in a soil profile that may become saturated during extended periods of heavy rainfall exceeding ¾ inch per hour. Saturating conditions would result in the likely hood of overland flow or saturated flow within the surface layer. The area lies within the transient snow zone and annually receives several rain or rain on snow events resulting in saturated soil conditions.

The large amount of coarse fragments (stones) armoring the surface moderates the erosion potential, but it is still advisable to maintain some debris and litter on the soil surface to minimize erosion risk. Shallow landslides are also a risk on steep slopes during saturated soil conditions. Maintaining vegetation with substantial root structure would reduce risk of shallow landslides on these soils.

Under dry or freezing/thawing conditions, for slopes over 65 percent, the surface soil becomes less stable and is subject to dry raveling if all vegetation, litter and debris layer is removed. The shallow soil may result in a higher risk of wind throw if the stands are opened up to wide spacing distances.

There are two management concerns with these soils: 1) the potential for surface erosion and dry ravel, 2) the potential for compaction and surface soil displacement.

Due to the substantial amount of clay and silt size particles in these soils, they are prone to becoming compacted when subjected to pressure from heavy equipment, dragging logs etc. The degree and depth of compaction would generally be higher when soils are subjected to pressure from logging activities, when the soil moisture levels are high. Once compacted, fine textured soils are very slow to recover (there is scattered, existing evidence of compaction on site, dating to the logging in the 1930's to 1950's). Compaction of the soil can reduce site productivity by limiting / restricting root growth in the compacted soil as well as limiting movement of O_2, CO_2 and H_2O into, out of and within the soil. On sloping sites compaction can result in increased rates of surface water accumulation and run off. On bare soil with slopes exceeding 35 percent, the hazard of erosion can be high. Minimizing compaction of soils in the project area and maintaining vegetation, litter and debris on and above the soil surface on the steeper areas, have been incorporated into the project design features (Chapter II).

Soils: Environmental Consequences

Alternative 1 (Proposed Action)

Project 1 (Commercial Thinning and Density Management)

Roads

Constructing 1,000 feet of new road would result in loss of top soil and compaction of sub-soil on approximately 0.4 acres of forested land and convert it to non-forest, (about 0.2 percent of the total project area). Reconstructing and improving 6,500 feet of existing road would result in approximately 3 acres of current non-forest land, (about 1.5 percent of the total project area), to remain in a non-forested condition. Some encroaching vegetation would be removed and surface rock would be added where needed.

Logging

Compaction and Disturbance/Displacement of Soil

Following completion of this proposed action, the majority of the vegetation and root systems would remain, along with surface soil litter and slash from thinned trees. Expected additional amounts of surface soil displacement, surface erosion and dry ravel resulting from commercial thinning operations should be minimal. Some additional soil compaction can be expected to result from this project, but the aerial extent and degree would remain within accepted district guidelines.

Impacts include the additional area used for landings. For many of the landings, a portion of the existing haul road or the harvest road is used for equipment to operate on. Some additional ground adjacent to the road surface is used to turn equipment around on and to sort and deck logs until transport. The degree of soil disturbance and compaction in areas where logs are sorted or decked is expected to be low. Areas where equipment turns or backs around on, multiple times would experience heavy compaction and disturbance to the top soil layer.

The estimated reduction in growth rate for trees on moderate to severely impacted areas is 15-30 percent during the first 10 to 20 years of growth. As trees age and become established, the negative effect on growth from soil compaction and displacement becomes less pronounced and growth rates may approach that of trees on similar, undisturbed sites.

The area affected by skyline yarding roads is about 3 percent of the skyline area or approximately 3.5 acres and is less than 2 percent of the total project area. Measurable affects on site productivity from this type of disturbance is minimal to none. Impacts usually result in light compaction of a narrow strip less than 4 feet in width. This is especially true for this type of project where logs are relatively small and there would be adequate slash on the ground in the corridors to yard over. About half of the area used for landings is counted as road surface. The area of surface soil disturbance and soil compaction resulting from skyline yarding landings not already included as road surface area is estimated to be 0.2 acres (as a percentage of the total project area approximately 0.1 percent).

For ground based yarding, impacts would vary depending on whether harvester / forwarder system or crawler tractors are used, how dry the soils are when heavy equipment operates on them and how deep the soils are covered with slash in the yarding roads. Impacts also include the additional area used for landings. For many of the landings, equipment would operate on existing haul and harvest roads and the additional adjacent ground would simply be used to sort and deck logs until transport. The active portion of landings would have similar amounts of displacement and compaction as tractor yarding roads. Areas where logs are decked would have minimal disturbance. In tractor yarding roads, expect a moderate amount of top soil displacement and moderate to severe soil compaction to occur depending on the amount of use. In harvester/forwarder yarding roads soil displacement is generally minimal to none and soil compaction is light to moderate.

If yarding is done using crawler tractors for the entire ground based area (72 acres), the percentage of total unit area impacted by surface disturbance and soil compaction as a result of landing construction would be approximately 1 percent (approximately ¾ ac.); from tractor yarding roads approximately 7 percent to 9 percent (approximately 5 to 6.5 ac.), percent of total project area affected: approximately 3 percent to 4 percent

If a harvester/forwarder system is used for the entire ground based area (72 acres), the percentage of total unit area impacted by surface disturbance and soil compaction as a result of landing construction would be approximately 1 percent (approximately ¾ ac.); from harvester / forwarder yarding roads approximately 2 percent to 8 percent (approximately 1.4 to 5.8 ac.), percent of total project area affected: approximately 0.8 percent to 3.1 percent. Very little or no top soil loss or displacement should occur. Some of the potentially impacted acreage listed above, includes already existing, compacted skid roads from previous logging in the 1930's to 1950's. Where practical, portions of these existing roads would be used for harvest roads for this project. As a result, the amount (acreage) of new or additional harvest impacts would be less than the totals listed above, while the total area (new and existing) of impacted ground is expected to be within the total ranges listed.

Site Productivity:

Skyline yarder systems: With the implementation of the project design features(one end log suspension where ever practical), soil impacts in harvest roads are expected to result in light compaction in narrow strips less than 4 feet in width. The trees in the project area have ample crowns, so there should be adequate slash on the ground to yard over. The effect on overall site productivity from light compaction on approximately 2 percent of the total area is expected to be low (probably no measurable reduction in overall yield for the project area).

Harvester/forwarder systems: With the implementation of the project design features (soils are fairly dry and equipment operates on an adequate layer of slash), soil impacts in harvest roads are expected to result in light to moderate compaction in two discontinuous, narrow strips less than 3 feet in width. The trees in the project area have ample crowns, so there should be adequate slash on the ground to yard over. The effect on overall site productivity from light to moderate compaction on approximately 3 percent of the total area is expected to be low (probably unmeasurable to less than 2 percent reduction in overall yield for the project area).

Tractor yarding: With the implementation of the project design features (soils are dry -less than 25 percent and equipment operates on some slash), soil impacts are expected to result in moderate, fairly continuous compaction within the landing areas and the main approximately 10 foot wide yarding roads. Impacts would be light to moderate and less continuous on less traveled portions of yarding roads. The effect on overall site productivity from mostly moderate compaction on less than 4 percent of the total area is expected to be less than 2 percent reduction in overall yield for the project area.

These estimates in reductions of overall yield are based on studies and observations done in western Oregon and western Washington and are by no means conclusive. Observation and study results vary widely. Studies recently being done by Weyerhaeuser Co. indicate that negative affects from compacted soil on growth of young trees becomes negligible within 8 to 12 years of planting. Effects from top soil loss or displacement may have more long term significance than the associated compaction.

The severity of compaction can be mitigated some what when slash and small logs are left in the skid roads and the total number of passes is low (less than 10). With tractor skidding, it is much harder to keep slash and debris on the skid roads for more than a few passes, so additional effort would be needed to replace slash and debris back onto skid roads. Operating only when soils are dry and soil strength is high would help to reduce the amount of crushing of individual soil aggregates and resulting depth of compaction. Multiple passes on moist or wet soil usually results in heavy compaction.

No measurable amounts of surface erosion are expected from the forested lands treated under this proposed alternative. With timber hauling restricted to periods when no water is flowing on road surfaces, the amount of sediment produced from roads and entering streams would be negligible to none.

Project 2 (Fish habitat enhancement)

It is unlikely that the proposed felling of 4 trees per 1,000 linear feet into a these streams would increase the risk for surface erosion. Minor quantities of soil may enter the streams primarily where the trees are felled into or immediately adjacent to the streams. Compaction of the surface soil from the felling of the trees would be negligible since the trees would remain in place where they are felled.

Alternative 2 (Reduced Road Reconstruction, Elimination of Culvert Installations and Additional New Road Construction – Applies to Project 1)

Same as alternative 1 with the following changes:

Roads and Landings

Constructing an additional 1,000 feet of new ridge top road (Unit 11A, P3) would result in loss of top soil and compaction of sub-soil on approximately 0.5 acres forested land converting it to non-forest land (0.25 percent of the total project area). Approximately 1,650 feet of reconstruction (R2) and two culvert installations would not occur leaving this road in a partially re-vegetated state.

Logging

Of the 177 total acres treated, 130 acres would be skyline yarded and 47 acres would be yarded using ground based systems. Based on the reduction of total acres impacted, the increased proportion of skyline yarding and reduction in amount of ground based yarding, a proportionate reduction in the amount of soil disturbance and compaction can be expected. Similar reductions on impacts to site productivity can be expected.

Alternative 3 (No Action)

There would be no change from the current conditions for the soil resources. Conditions would remain as they are at present. No changes in aerial extent of disturbed soil.

E. WATER/RIPARIAN

Water: Affected Environment

Precipitation of the Project Area

The project area lies in headwaters of the Upper Siletz River 5th-field watershed (HUC# 1710020404). There are two stream catchments draining the project area: Little Boulder Creek, part of the Lower North Fork Siletz 6th-field watershed and Rogers Creek, part of the South Fork Siletz 6th-field watershed.

The project area has one of the highest precipitation rates in the mid coast, receiving approximately 155 inches of rain annually and having a mean 2-year precipitation event of 6.5 inches in a 24-hour period (N.O.A.A. Precipitation-Frequency Atlas for Oregon, Volume X). Most runoff is associated with winter storm events that result from low pressure fronts moving inland from the southwest off the Pacific Ocean. Peak stream flow events are concentrated in the months of November through March when Pacific Storm fronts are strongest. As a result of little or no snowpack accumulation and infrequent rainfall, stream flow in the summer is typically a fraction of winter levels and many headwater channels retreat to subsurface flow. At a distance of over 19 miles from the ocean, fog and fog drip are not significant contributors to watershed hydrology in the project area (Soil Service).

Terrain in the project area watersheds is generally mountainous with elevations ranging from approximately 960 to 3,400 feet. While snowpack accumulation in the Oregon Coast Range is unusual, these elevations are within a transient snow zone. In most years, at elevations above 1500 feet, snow remains for short periods and may be subject to rain on snow events (ROS) (U.S.D.I. 1995). Overlapping areas between high intensity rainfall and high ROS events are particularly vulnerable to extreme storm events and may lead to large flood events (USDI 1996). Streams in the project area, drain Fanno Peak, Riley Peak and nearby ridges of moderate slope. Soils in the Upper Siletz watershed can be highly erosive, due to their high infiltration and percolation rates. However, little overland flow occurs except on convex slopes and when soils are frozen or compacted. Mass wasting and dry-raveling of loose materials are the primary erosion processes. Slope hazard in the project area is rated as "low."

The Upper Siletz Watershed Analysis identifies one road-related landslide in the southern portion of the project area, just above a tributary to Rogers Creek (U.S.D.I. 1996). The identification is based on aerial photographs. Following field verification, it is not clear if the material has resulted from a landslide or if it is sidecast material from road construction. It is believed the material has been in place from the 1950s to 1960s and is currently stable (see Soils report).

Project Area Streams

The project area includes 1st to 3rd order, intermittent and perennial streams. The majority of 1st order channels are Rosgen type A intermittent source channels: 4 to 10 percent gradient, entrenched, low width/depth ratio, and low sinuosity. Channels are typically "step-pool" in form, which transition to cascade at valley constrictions. Most of the stream channels in the project area are filled with colluvium due to raveling hillsides and periodic debris torrents, which may strip the channels to bedrock. Many streams are completely buried by colluvium, causing subterranean flow. Channel substrates are typically cobble and gravel, with steeper reaches dominated by boulder and bedrock.

The central 2nd order stream and Little Boulder Creek at the northern boundary of the project area, include reaches of Rosgen type "B" channel types, (2 to 4 percent gradient, with low, moderately-confined banks, low width/depth ratio, and moderate sinuosity), at the mouths of steep tributary valleys where they enter broad valley flats.

Channel morphology is ripple/pool or dam/pool with gravel and cobble dominated banks and bed. Little Boulder Creek has evidence of beaver activity, contributing to channel CWD. These streams may flow subsurface before they resurface downhill on these valley flats. These are depositional/transport reaches for sediment and wood moved from upstream floods and debris flows. Sediment is stored on bars and behind debris jams, providing potential fish habitat.

The central 2nd-order tributary forms a wetland in a broad alluvial flat. Here the main channel becomes an interconnected channel system, meandering slightly through colluvium and alluvial materials. Riparian vegetation is dominated by brush including salmonberry, vine maple, salal, and thick young alder patches, providing little shade directly over the stream channel. Average shade for this reach of Little Boulder Creek is estimated at 67 percent (ODWF).

All of these channel types viewed in the project area are vegetatively stabilized and currently in proper functioning condition (U.S.D.I. 1998). None of the channels in the project area are currently functioning at risk or nonfunctional; none of the channels exhibit indications of instability (i.e. high rates of bank erosion and sediment transport, nick points, etc).

Project Area Water Quality and Beneficial Uses

Fine Sediment and Turbidity

During field review of stream channels in the project area, channels were observed to be stable and functional with sediment supplies in the range expected for these stream types. However, no turbidity data was located for this analysis. Currently there is not enough sediment data in these watersheds to provide a detailed representation of water quality conditions. In response to these concerns, physical and biological monitoring in these watersheds is ongoing.

Stream Temperature

No stream temperature data for Little Boulder Creek, Boulder Creek, the North Fork Siletz, or Rogers Creek was located for this analysis. Stream temperature monitoring during the summer of 1996 (period of record 8/8/96 to 9/17/96) in the South Fork Siletz, downstream from the project area just below the confluence with McFall Creek, showed temperatures exceeding the State of Oregon's Department of Environmental Quality's standard of 17.8° C for 10 days.

Streams in the project area are classified as having a "low" risk of detrimental changes in water temperature (USDI 1996). The headwaters of most channels in the project area are ephemeral and/or buried by collvium and do not flow on the surface during most summers. Consequently, these channels have little potential to be heated by direct solar radiation. Perennial channels in the project area include 3 tributaries to Rogers Creek in the southern half and 3 tributaries to Little Boulder Creek in the northern half. Single sample temperature readings were taken for perennial streams in the project area during August 2002. All readings were found to be well below the state's water quality standard of 17.8° C (8.9° to 11.1°C). While useful as a general indicator of water quality temperature at that moment in time, this data is not sufficient to characterize water quality trends or the maintenance of state water quality standards.

Based on field observations and aerial photo reviews of the perennial streams in the project area, current streamside vegetation and colluvial fill is adequate to shade surface waters during summer base flow and it is likely that stream temperatures consistently meet the Oregon state standard.

Other Water Quality Parameters

Additional water quality parameters (e.g. nutrients, dissolved oxygen, pesticide and herbicide residues, etc.) are unlikely to be affected by this proposal and were not reviewed for this analysis (U.S.E.P.A. 1991).

Oregon Department of Environmental Quality (DEQ)

The Oregon Department of Environmental Quality's (DEQ) 1998 303d List of Water Quality Limited Streams (http://waterquality.deq.state.or/wq/303dpage.htm) is a compilation of streams which do not meet the state's water quality standards. A review of the listed streams for the Upper Siletz River watershed was completed for this report. Neither Rogers Creek, Little Boulder Creek, the South Fork of the Siletz nor the North Fork of the Siletz and their tributaries are listed on the 1998 303d report. Downstream of the project area the mainstem Siletz River is listed from its mouth to Rock Creek for exceeding summer temperature standards.

The DEQ published an assessment, the 319 Report, which identifies streams with potential non-point water pollution problems (1988 Oregon Statewide Assessment of Nonpoint Sources of Water Pollution). No water quality issues were identified for Rogers Creek or Little Boulder Creek. The Siletz River was identified downstream of the project area as having "moderate water quality by observation" for fish, aquatic habitat, and general water quality conditions. However, no description of the problem or data in support was located in the report. Other sources of information (watershed analysis, ODFW habitat surveys) give more up to date information, supported by data, on fish and aquatic habitat conditions for these streams (see the Fisheries report in this assessment).

Beneficial Uses

Beneficial uses of surface water from the project area are displayed in Table 4. There are no known municipal or domestic water users in the project area. There are no water rights listed for Rogers Creek or Little Boulder Creek. In-stream water rights occur along the Siletz River approximately **5** miles downstream of the project area. Additional recognized beneficial uses of the stream-flow in the project area include anadromous fish, resident fish, recreation, and esthetic value.

Table 4. Beneficial Uses Associated with Streams in the Project Area

Stream (Catchments-7th field)	Proposed Activity	Beneficial Use of Water	Approximate Distance from Project	Information Source
Little Boulder Creek (Lower North Fork Siletz)	Stand density management Road construction/ reconstruction	Anadromous fish	greater than 3 miles downstream from project area	U.S.D.I. 1996
		Resident fish	Immediately below project area	U.S.D.I. 1996
		Domestic use	greater than 10 miles	WRIS[1]
		Irrigation/live stock watering	greater than 10 miles	WRIS
Rogers Creek (South Fork Siletz)	Stand density management Road construction/ reconstruction	Anadromous fish	1 mile downstream of project area	U.S.D.I. 1996
		Resident fish	Immediately below project area	U.S.D.I. 1996
		Domestic use	greater than 10 mile	WRIS
		Irrigation/live stock watering	greater than 10 miles	WRIS

1. WRIS = *Water Rights Information System* on the Oregon Department of Water Resources website.

Best management practices, as described below under Environmental Consequences, would be implemented to help eliminate and/or minimize any potential impacts to beneficial uses of the project watersheds.

Water: Environmental Consequences

Alternative 1 (Proposed Action)

Project 1 (Commercial Thinning and Density Management)

Direct and Indirect Effects

Measurable effects to watershed hydrology, channel morphology, and water quality as a result of the proposed action are unlikely. This action is unlikely to alter the current condition of the aquatic systems either by affecting its physical integrity, water quality, sediment regime or in-stream flows.

This proposal is unlikely to substantially alter stream flow or peak flow events. Tree removal and road renovation and construction would not occur on steep, unstable slopes where the potential for mass wasting adjacent to stream reaches is high. Therefore, increases in sediment delivery to streams due to mass wasting are unlikely to result from this action. In addition, potential impacts resulting from tree harvest and road construction/renovation would be mitigated to reduce the potential for measurable sediment delivery to streams, by implementing Best Management Practices (BMPs), such as stream and road buffers, minimum road widths, minimal excavation, ensuring appropriate drainage from road sites, etc. Within riparian zones, substantial portions of the riparian canopy would be retained, therefore maintaining riparian microclimate conditions and protecting streams from increases in temperature.

In conclusion, this proposal is unlikely to impede and/or prevent attainment of the stream flow and basin hydrology, channel function, or water quality objectives of the Aquatic Conservation Strategy (ACS). Over the long term, this proposal should aid in meeting ACS objectives by speeding the development of older forest characteristics in the riparian zone.

Streamflow

Alterations in the capture, infiltration and routing (both surface and subsurface) of precipitation as a consequence of the mechanical removal of trees and reduction in stand density, has been documented on watersheds in the Pacific Northwest and other parts of the world. A review of 94 catchment experiments to determine the effect of vegetation changes on water yields and evapotranspiration, determined that reductions in forest cover of less than 20 percent cannot be detected by measuring stream flow using the "hydrometric method" (Bosch. et al 1982). Because the Little Boulder Thinning project would affect 0.5 percent of the forest cover in the Upper Siletz River watershed, it is unlikely to produce any measurable increase in streamflows.

However, the proposed project was further analyzed on a smaller scale for its potential contribution to cumulative effects to stream flow in the two catchments (7^{th}-fields) of Little Boulder and Rogers Creek (see Cumulative Effects in this document).

Water Quality

Sediment Delivery to Streams and Turbidity

Two natural erosion processes; mass wasting and surface erosion, are the primary sources for sediment delivery to streams in the project watersheds. Mass wasting in these watersheds is generally limited to hillslopes with gradients steeper than 60 percent (USDI 1995, USDI 1997). Management on steep slopes may accelerate mass wasting processes. Surface erosion processes in the Oregon Coast Range are nearly non-existent on forested land due to the high infiltration capacity of native soils, heavy vegetative growth and deep layers of surface organic material or duff layer. However practices that compact the soil surface, remove the duff layer or concentrate runoff may lead to surface erosion with the potential for sediment delivery to streams and a degradation of water quality.

Management practices with the potential to accelerate erosion fall into three categories: road construction, timber harvest, and site preparation (particularly prescribed burning). Best management practices (BMPs) and mitigation measures would be implemented to eliminate and/or limit acceleration of sediment delivery to streams in the project area as described below:

Riparian "No-Treatment Zones"

For the protection of stream channels and aquatic resources, riparian buffers or no-treatment zones were applied to all stream channels in the project area. These zones were determined in the field by BLM personnel following a protocol developed by the area hydrologist, biologists, and riparian ecologist. Stream buffers extend at least 50' from stream channels. This zone could be extended upslope during field surveys as far as deemed necessary to protect aquatic resources. This determination was based on site features such as floodplains, slope breaks, slope stability, water tables, etc. Additionally, no treatments in the riparian areas are proposed unless stand densities and composition clearly indicate the need. Hence, large areas of riparian vegetation were excluded from treatment under this proposal.

Road Construction and Timber Hauling

All proposed road construction and reconstruction locations have been reviewed in the field for potential effects to water quality. Approximately 1,000 feet of new ridgetop road construction is proposed in Unit 11-C (Roads P1 and P2). The proposed roads would occur on moderate to low gradient slope (less than 10 percent) outside of the riparian reserve, with no stream crossings. The risk of impacts to water quality due to road construction would be limited by restricting work to periods of low rainfall and runoff. Construction would employ techniques to reduce concentration of runoff and sediment to a minimum, such as outsloping and water-bars on steeper sections of road. The new construction would be decommissioned upon project completion.

Approximately 3,600 feet of existing roads would be renovated. This work could include brushing, blading, surfacing, and drainage structure maintenance. These activities are unlikely to measurably impact channel morphology or water quality. Drainage improvements (including the installation of additional crossdrain culverts) would likely improve water quality over existing conditions.

Approximately 2,900 feet of existing roads would be reconstructed (Roads R1 & R2). This work would include brushing, blading, minimal excavation, and surfacing. Two 100 year flood design culverts would be installed on R2. The northernmost culvert would span a small, intermittent tributary close to its source. The second culvert would be installed on the central perennial tributary in the project area to Little Boulder Creek. At the site of the former stream crossing, the stream is entrenched and currently down-cutting through fill materials. Stream banks are near vertical and actively eroding. The culvert installation would entail moving the crossing several feet upstream from the former crossing, to the south, where the gradient and side slopes are significantly gentler. This would minimize the amount of fill needed, while not exacerbating the steeper side slopes downstream.

Some increases in sedimentation (and resulting increases in turbidity) can be expected during culvert installation, as equipment is operating in the stream channel and some trees would need to be removed from the stream bank. However, such increases are likely to be of local extent and of short duration. Construction would occur under minimal flow conditions and sediment increases are not expected to significantly exceed current levels. Following culvert installation, cut and fill slopes would be grass seeded to limit the potential for soil erosion and riprap would be placed as needed for bank stabilization.

The project would also utilize an existing quarry site located north of Unit 11A. Material from this site would be utilized for road surfacing and is unlikely to significantly impact the aquatic resources in the project area.

Timber hauling would be permitted only during periods of dry weather and low soil moisture, generally between April 1 and December 1. Timber hauling during periods when water is flowing on roads and into ditches could potentially increase stream turbidity if flows from ditches were large enough to enter streams. All hauling would be restricted at any time of the year if necessary to avoid excessive increases in sedimentation. Additionally, improvements to existing roads would occur prior to hauling and would be ongoing as needed during the project. Road improvements aimed to limit potential impacts to water quality include but are not limited to: 1) increasing aggregate surface depth where necessary to support haul and reduce sediment discharge into area streams, 2) adding sediment traps to ditches above culverts, 3) construction of drain dips on lesser-used roads, and 4) avoiding vegetation disturbance within ditches along BLM controlled roads during the life of the sale (see Roads section).

Tree Harvest and Yarding

The creation of yarding corridors and the mechanical removal of trees are unlikely to significantly impact project area hydrology. The small number of trees being yarded would limit surface disturbance to minimal levels. Tree removal is not proposed on steep, unstable slopes where the potential for mass wasting adjacent to streams is high. Therefore, increases in sediment delivery to streams due to mass wasting are unlikely to result from this action.

Yarding corridors, if sufficiently compacted, may route surface water and sediment into streams. However, several factors could limit the potential for this to occur. Even if compacted, high levels of residual slash left on yarding corridors (both machine and cable), would reduce runoff by deflecting and redistributing overland flow laterally to areas where it would infiltrate into the soil. Existing skid roads would be used for ground-based equipment as much as possible, to reduce additional compaction and the total surface area of landings would be kept to a minimum. In addition, no-treatment zones in riparian areas have high surface roughness, which function to trap any overland flow and sediment before reaching streams.

Site Preparation

No post treatment site preparations, such as under-burning or soil scarification, are proposed. Pile burning along roads and on landings may produce small patches of soil with altered surface properties that restrict infiltration.

However, these surfaces are surrounded by large areas that would easily absorb any runoff or sediment that may reach them. Pile burning would occur away from surface water or streams. No pile burning would take place within the Riparian Reserves.

Stream Temperature

This proposal is unlikely to have any measurable effect on stream temperatures in project area watersheds. Forest stand density and hence, shading within stream buffers and adjacent to streams in the project area, would be left virtually unaltered under this proposal. Most streams in the project area have short reaches with little to no canopy shading inter-dispersed with reaches buried by colluvium and discontinuous surface flow. Additionally, almost all project area streams are headwater streams, having their origins within or just outside the sale boundary. Close to these groundwater/surface water interfaces, stream temperatures are relatively insensitive to changes in stream temperature and are consistently well below ODEQ temperature standards.

One exception is the site of the culvert installation on the central tributary to Little Boulder creek. Because the crossing is being relocated upstream from the previous stream crossing, some trees would need to be removed from the stream bank to construct the crossing. This would cause some temporary onsite instability and increased sedimentation during construction. In addition, the removal of trees from the stream bank would reduce canopy shading at the crossing. However, because of the reasons listed above and the fact that the culvert itself would be shading the stream, the culvert installation is unlikely to have a long-term measurable affect on stream temperature in this tributary.

Channel Stability and Function

In the short term, this proposal is unlikely to alter the current conditions of channels in the project area, with the exception of the culvert installations. Culvert installation would necessitate onsite modifications to the stream channel and streambanks, however these modifications would not exacerbate and may even improve channel function over current conditions.

Culvert installation would minimize channel fill and restrict in-channel work to low flow periods. After installation, stream banks would be re-contoured and stabilized. It is also recommended to pull back fill at the site of the former stream crossing on the central tributary to Little Boulder Creek to decrease bank erosion and help further stabilize the side slopes.

Over the long term, reductions in stand density would likely increase riparian forest health and tree size. This would lead to increased large wood recruitment for stream channels, an important factor in proper channel function. In addition, more open stands would allow for the growth of important riparian species in the understory. Additional large wood in project area channels would ultimately slow stream velocity, increase retention of organic material, capture bedload, and improve aquatic habitat.

Cumulative Effects

Streamflow

In almost all cases, removal of more than 20 percent of the vegetative cover over an entire watershed would result in measurable increases in mean annual water yield. Removal of less than 20 percent of vegetative cover has resulted in negligible changes where it was not possible to detect any effect (i.e. the error in measurements was greater than the change) (Bosch 1982). Typically increases in stream flow occur during periods of low soil moisture and are attributed to reductions in evapotranspiration.

Jones and Grant (1996) hypothesized that clear-cutting leads to increases in storm flow volume while road construction and wood removal from channels results in earlier, higher peak flows. Alterations in peak flow timing and quantity are of particular concern in watersheds with potential for snow accumulation and quick melt-off during rain-on-snow events (ROS).

The proposed project would affect 0.5 percent of the forest cover in the project watershed. Therefore, its cumulative effects on stream flow cannot be measured within a reasonable degree of accuracy, however, in order to attempt to more accurately quantify the risk for cumulative effects to hydrologic processes, channel conditions and water quality from the proposed action, a preliminary analysis for both the Little Boulder and Rogers Creek catchments (7^{th}-fields), was conducted utilizing the *Salem District Watershed Cumulative Effects Analysis Procedure 1994*. The results of this analysis are presented below.

Cumulative Effects Preliminary Analysis Results

The two catchments of the project area were initially analyzed for land ownership, vegetation type, age class, and extent of transient snow zone. Using these parameters and the methodology of the *Salem District Watershed Cumulative Effects Analysis Procedure 1994,* a risk factor ("rfactor") was calculated to determine the relative risk or sensitivity of areas to increases in runoff and consequently peak stream flows. For more detailed results of the preliminary analysis see the hydrology report in the NEPA project file.

The preliminary analysis indicates currently a low to moderate risk level for cumulative effects to water quality, channel conditions, and hydrologic conditions in the Little Boulder and Rogers Creek catchment. However, a large amount of catchment acreage (92 percent in Little Boulder and 83 percent in Rogers Creek) lies in the transient snow zone and is at risk for increasing peak flows due to ROS events. In addition, a large acreage of upland forest is available for harvest and/or thinning in the next 10 years, creating the potential for forest management to contribute to cumulative effects and increased peak flows. In response, a more intensive analysis was conducted to further define these risks.

A Level 1 analysis for increase in peak flows was conducted using the Washington State DNR watershed analysis methods (Washington Forest Practice Board, 1997).

Because of the difficulty in obtaining accurate data for individual catchments, and the project area being divided between the two catchments, the Little Boulder and Rogers Creek watersheds were combined for use in the model. Details of the analysis are contained in a supplemental report: *Cumulative Effects Analysis for the Little Boulder and Rogers Creek Catchments.*

Summary of Level 1 Analysis

In summary, the level 1 analysis conducted using the Washington State DNR watershed analysis methods found an "indeterminate" sensitivity to increases in peak flows. The methods include using the WAR ("Water Available for Runoff") model, which calculates increases in water available for runoff based on precipitation, elevation, land use/vegetation cover, baseline discharge, and proposed changes to land use/vegetation cover during the next 10 years. The WAR model estimated an 11.6 percent increase in an unusual 2-year peak flow above hypothetical full forest cover. Consequently, it was concluded that potential cumulative effects leading to increases in peak flows, under this proposal in conjunction with other likely actions in the two catchments during the next decade, should not be ruled out. Therefore, it was suggested that additional information be collected/analyzed in order to provide a more detailed assessment of the risks to the aquatic system (i.e. a Level 2 Assessment). Additionally, the analysis stated that, "the indeterminate rating does not require that the actions considered under this proposal be delayed or postponed." Rather, it points to the possibility of impacts to the aquatic ecosystem in the Little Boulder and Rogers Creek catchments at some point during the 10-year analysis period.

A WAR analysis that separated public from private actions in the catchments found that the 10 percent threshold would be exceeded without any forest management on public lands (see Hydrology Report - Appendix 1). Forest management on public lands alone (i.e. private lands would remain un-harvested) is predicted to increase a 2-year unusual storm event from 1922 cfs to 2100 cfs; an increase of 9.3 percent over full forest conditions and only 1 percent over current conditions. The increases predicted in this assessment still remain far below the 20 percent increase in a 2-year peak flow given as a threshold value for considering the effects of increased bed mobility and scour.

Consequently, this proposal is unlikely to impede and/or prevent attainment of the stream flow and basin hydrology, channel function, or water quality objectives of the Aquatic Conservation Strategy. Over the long term, this proposal should aid in meeting ACS objectives by speeding the development of older forest characteristics in the riparian zone.

Project 2 (Fish habitat enhancement)

The direct, indirect, and cumulative effects to project area hydrology would be similar to Project 1 with the exception of effects to the stream channel condition of Little Boulder Creek and its tributary adjacent to the east boundary of the project area.

In the short term, this action may immediately increase sedimentation and flow turbidity. Over the long term, the action would likely slow stream velocities, increasing sedimentation and raising the channel bed level.

Little Boulder creeks channel currently has a high sediment load, in part due to beaver dams and reaches of low gradient (low energy flow). However, the channel reach of Little Boulder Creek which passes through the project area is currently lacking in large wood and is entrenching. The addition of large wood into the channel may help to stabilize the channel banks by encouraging substrate attrition and restoring channel function.

Alternative 2 (Reduced Road Reconstruction, Elimination of Culvert Installations and Additional New Road Construction – Applies to Project 1)

This alternative would differ from the proposed alternative in that approximately 1,000 feet of new ridgetop road would be constructed in Unit 11A. Approximately 1,650 feet of reconstruction (R2) and two culvert installations (R2) would not occur.

This alternative would greatly reduce impacts to the aquatic system by eliminating any potential disturbance to water quality associated with culvert installation and road reconstruction in riparian reserve. The proposed new construction would be entirely on ridgetop, away from streams, and would be unlikely to have any significant impact on aquatic resources in the project area.

Cumulative effects would not differ under this alternative.

Alternative 3 (No Action)

No action would result in the continuation of current conditions and trends at this site as described in the Description of the Affected Resource section of this report and in the Upper Siletz Watershed Analysis document.

Riparian: Affected Environment

Riparian Reserve Widths and Stream Influence Zones

Riparian Reserves in the proposed project would be 420 feet on each side of perennial fish-bearing streams and 210 feet on each side of intermittent and perennial non-fish bearing streams (Table 5). These widths are in conformance with the *RMP* (p.10). Within these Riparian Reserves, stands would be thinned to densities ranging from approximately 47 to 75 trees per acre. The actual riparian vegetation along streams would be excluded from treatment and designated as stream protection zones (SPZ). Only the upslope portions of the Riparian Reserves would be proposed for density management. See the attached document for criteria used to identify stream protection zones.

Table 5

UNIT	RIPARIAN RESERVE ACRES	STREAM PROTECTION ZONES (SPZ) AVERAGE WIDTH (FEET)
11A	15	60
11B	24	80
11C	28	60
11D	8	80
11E	6	80
11F	20	70

Large Woody Debris (LWD) in Streams

Wood in tributary channels in the project area was not measured. However, observations of wood quantities were made during field survey work. There are typically moderate to large amounts of wood (relative to other high gradient, intermittent channels in the Oregon mid-coast range) throughout the drainage. Much of this material remained after logging operations that occurred in the 1940s and 1950s when logging practices were typically "messy" (i.e., large quantities of wood considered of inferior quality were left behind). Recent additions of wood are predominately smaller sized deciduous species and occasional second growth conifer that has blown down or fallen over due to slope instability.

Riparian: Environmental Consequences

Alternative 1 (Proposed Action)

Project 1 (Commercial Thinning and Density Management)

Long Term Increase in Quality LWD Recruitment

In the long term, trees within the treated stands that are smaller than stand average and at a consequently higher risk of mortality, would reach large diameters earlier compared to the no treatment option, creating natural opportunities for larger LWD recruitment. Large amounts of smaller wood would continue to fall from within the stream protection zone where no treatment takes place, and larger wood would begin to be recruited from higher up the slopes as the treated stands reach heights of 200 feet. Thus, wood with a larger range of sizes would potentially be recruited into streams over the long term in treated stands.

Maintenance of stream temperature through shading

Stream shading would not be affected by the proposed treatments. Stream protection zone widths average 60 to 80 feet wide (see Table 5), with some areas over 100 feet in width. In addition, topographic shading occurs on streams which occur in Units 11E and 11F.

Project 2 (Fish habitat enhancement)

Immediately after the sale approximately 4 trees per 1,000 feet of stream (or 4 trees per acre) would be felled into Little Boulder Creek and its tributary which is adjacent to the east boundary of the project area and within the stream protection zone. These trees would be average stand diameter or larger, however all trees would be less than 28 inches DBHOB. These felled trees are the only ones guaranteed to fall into the streams, with all others falling naturally in generally random directions. The addition of logs to the stream would enhance sediment storage and serve as habitat for amphibians and aquatic insects.

Alternative 2 (Reduced Road Reconstruction, Elimination of Culvert Installations and Additional New Road Construction – Applies to Project 1)

Alternative 2 would construct a new road along the ridge in Unit 11A and eliminate installation of two new culverts. All density management prescriptions would remain the same and environmental consequences within the Riparian Reserves would not change from Alternative 1, with the following exception: No trees would be cut at the sites of the new culvert installations proposed in Alternative 1.

Alternative 3 (No Action)

1. There would be no disturbance and consequently no microclimate changes in the Riparian Reserves.

2. There would be no short term elevated risk of bark beetle infestation. However, as stand health is compromised due to high densities, risk of long term bark beetle infestation is increased.

3. Stand mortality due to competition would increase, creating increased amounts of small CWD, snags and instream LWD.

4. Trees would continue at their present rate of growth, slowing as the canopy closes and competition for light becomes more intense (Table 3).

5. Crown ratios would decrease at a faster rate compared to Alternative 1. Wind firmness and individual tree stability would decrease as crown ratios decrease.

6. Risk of catastrophic consequences due to wildfire may increase. Densely stocked stands with consequent large numbers of small snags and CWD burn more readily and are more subject to crown fires than stands growing at lower densities.

7. Natural disturbance would be the agent for creation of stand structural diversity. The most likely agent for this disturbance would be wind, which would create openings in patches. It is unknown how long it would take for natural disturbance to create the structural and species diversity needed in this watershed, but it is expected, based on experience and a considerable body of research, that this diversity would take considerably longer to develop than if the proposed treatment were implemented. Some researchers have theorized that "old growth" as currently defined may never occur in today's dense managed stands.

F. WILDLIFE

Wildlife: Affected Environment

Wildlife Habitat

The 177 acre thinning project is part of a 5,000+ acre BLM checkerboard of mid-seral conifer forest within the Upper Siletz River watershed. Within this forest of mid-seral habitat there are scattered small patches of early-seral (0 to 39 years) and deciduous forest habitat. Streams and roads provide corridor habitat throughout the matrix and they are usually dominated by deciduous hardwoods like bigleaf maple and red alder. Mid-seral forests in the Coast Range of Oregon are currently dominated by Douglas-fir with scattered and clumped western hemlock, western redcedar, and various hardwoods. These forests have stands that are structurally simple and are characterized by a single-layered, dense, overstory canopy with little large wood, either dead or alive, standing or down, remaining from the previous stand conditions. The project area is typical of higher elevation forests in the central Oregon Coast Range in that there is an increased presence of noble fir in the stand. The current composition of noble fir ranges from 6 to 15 percent of the conifer species in the six units.

Table 6. Coarse Woody Debris conditions and prescription within the Little Boulder Creek Project Area[1]

Current Coarse Woody Debris conditions. [1]				
Proposed Units	**Down Wood (Cubic feet/acre)**		**Snags [>10"height and >10" diameter (DBH)]**	
	All Species	Conifers Only[2]	# snags per acre	Size (avg dbh in inches)
11 A	6,264	6,264	1.7	19.9
11 B & E	11,684	11,684	15.5	18.3
11 C & F	4,376	4,376	31.8	24.7
11 D	420	420	7.1	12.9

[1] Down wood in cubic feet per acre and the number of standing snags were derived from the forest stand surveys collected in 2001.
[2] Conifers contribute 100% of the total down wood recorded on surveys in this project area.

Special Status and SEIS Special Attention Species

The northern spotted owl (*Strix occidentalis caurina*) is the only Special Status species which may be affected by this action. SEIS Special Attention species have been surveyed for and none have been found in the action area. Refer to Appendix K, *NEPA Impacts Analysis for Listed Terrestrial Wildlife Species,* for a complete list of species of concern in the Marys Peak Resource Area and how they may be impacted by this federal action.

The project area has no suitable nesting/foraging/roosting habitat or Reserve Pair Area habitat but does fall within designated Critical Habitat for the owl. The mid-seral forest does provide owl dispersal habitat. The closest known active owl site is about three miles to the east of the project and is also the closest known patch of suitable nesting habitat on BLM lands.

Wildlife: Environmental Consequences

Alternative 1 (Proposed Action)

Project 1 (Commercial Thinning and Density Management)

Wildlife Habitat

The commercial thinning and density management prescriptions for the proposed alternative would remove the suppressed, intermediate, and smaller co-dominant Douglas-fir, western hemlock, and noble fir and leave the dominant and larger co-dominant conifers. The treatments would remove an average of 169 trees per acre. Since the largest trees with the best crown ratios would be left the post-treatment crown canopy is expected to be 50 percent or greater over most of the action area. Currently the stands have some soft and hard snags and coarse woody debris but they are all in the smaller diameter classes. Treatment would decrease the recruitment time necessary for the development of larger (greater than 24 inch diameter) hard snags, coarse woody debris, and a more complex overall stand structure which would provide more nesting opportunities for owls and murrelets. A short term impact would be a simplification of stand structure due to the removal of trees, however the planned treatment would have no significant impact on the composition and function of these mid-seral stands.

The project units occur in a portion of the watershed that has a checkerboard BLM-private industrial timber ownership pattern. The project is consistent with the current long-term objectives for BLM's AMA and RR lands in this watershed which are to provide late-seral and old-growth habitat for owls, murrelets and other species dependent upon older forest structure. The private industrial forest acres within the watershed are currently harvested sometime during the mid-seral stage of habitat development. Under current management plans, these private lands will never provide late-seral (80 to 199 years old) or old-growth (200+ years) forest habitat. The BLM's Riparian Reserve lands would also function as landscape corridors by providing mature forest connectivity between different aged patches throughout the watershed as they connect with stream buffers on private lands.

Special Status and SEIS Special Attention Species

Northern Spotted Owl: The project's treatments would not adversely modify or destroy designated owl critical habitat. The short-term negative impacts to owl dispersal habitat would not be minimal since the thinning would maintain overstory canopy cover above 40 percent, the scattered small openings (0.25 to 1 acre) would not exceed ten percent of the total treatment acres, and the untreated mid-seral matrix forest provides abundant dispersal habitat within the watershed. The long-term impacts of the proposed project on owl habitat would be positive because the forest stands would develop into suitable nesting/foraging/roosting habitat sooner then if left unthinned.

Project 2 (Fish habitat enhancement)

The felling of scattered trees within the project area would not destroy or adversely modify critical or dispersal habitat for the northern spotted owl or the marbled murrelet.

Alternative 2 (Reduced Road Reconstruction, Elimination of Culvert Installations and Additional New Road Construction – Applies to Project 1)

This alternative is identical in treatment area to the proposed action. The anticipated impacts to wildlife species resulting from changes to forest structure are the same as discussed for the proposed action. The only difference in this alternative is related to the amount of additional road that would be constructed and the reduction of road to be renovated. This alternative would allow for about 1,000 feet of additional road to remain open for future treatments. Retaining this road in an open condition indefinitely, presents a relatively minor disturbance potential to wildlife species within this area, and is unlikely to compromise the desired beneficial effects anticipated to occur as a result of treatments to forest structure.

Alternative 3 (No Action)

Under the no action alternative the uniform, single layered, mid-seral stands would continue to grow and develop into late-seral size and structure at a slower rate then if released through thinning. There would be no impacts to owl dispersal habitat or to the mid-seral dependent wildlife species currently using these stands for nesting, foraging, dispersal, resting, and escape habitat. Species dependent on more complex structure would avoid these stands for a longer period of time.

G. FISHERIES

Fisheries: Affected Environment

The Little Boulder Creek Project area is in the headwaters of Little Boulder Creek. Little Boulder Creek meanders through a small valley that is low gradient and dominated by smaller substrate materials (fines, sands and gravels). Steep tributary streams to Little Boulder Creek flow through the project area.

These steep small intermittent and perennial streams are dominated by larger cobbles, gravels and boulders. Project area streams have low levels of LWD. The steeper headwater streams found in the project area are transport reaches that contribute material to the lower depositional reach (Little Boulder Creek). These transport reaches are important for habitat diversity in the lower reaches.
There were no fish found in any part of the project area. Cutthroat trout (*Oncorhynchus clarki*) and Sculpin (*Cottus sp*.) can be found further down stream in Little Boulder Creek where flow and gradient permit fish to take residency. Coho Salmon can be found approximately nine miles down stream at Siletz Falls.

Listed Fish Species

Coastal Coho Salmon (*Oncorhynchus kisutch*) are listed as threatened under the Endangered Species Act. Coho Salmon are down stream from the proposed units approximately nine miles.

Fisheries: Environmental Consequences

Alternative 1 (Proposed action)

Project 1 (Commercial Thinning and Density Management)

This alternative would have no measurable adverse impacts to resident or anadromous fish and fish habitat down stream. Habitat and channel conditions are expected to be maintained. Some short term increases in turbidity may occur but would be negligible. Skyline yarding in sloped areas, the small amount and size of timber (thinning) being hauled out in conjunction with stream protection buffers (50 foot minimum) and seasonal restrictions (see design features) would keep sediment delivery to streams to a minimal level. Ground based yarding would occur on slopes under 35 percent. This would keep compacted skid trails from channeling water and sediment delivery to a minimum. Log haul would be seasonally restricted to ensure water quality is maintained.

Thinning within the riparian area would enhance stand conditions, growing trees faster than if the stand were to grow naturally. This would increase the potential for high quality large woody debris (when current wood is decayed) and increase species diversity.

Most streams are intermittent and have topographic relief. All streams have a 50 foot buffer that would maintain shade and the current temperature regime.

Since Little Boulder Creek is a depositional reach within the project area, sediment and large woody debris transport is unlikely. Stream protection zones (50 feet or greater) and the trees retained would maintain stream temperature. Other design features such as seasonal restrictions would keep impacts to a minimum. Down stream these impacts would be insignificant to listed fish. Therefore, this project would have No Effect on listed fish.

Road renovation would increase road drainage of surface water (cross drain pipes) that directly supplies sediment to local streams. This would reduce the amount of sediment delivered to streams from project area roads.

All road construction, reconstruction, renovation and log haul would be seasonally restricted to avoid water quality degradation (see design features).

Project 2 (Fish habitat enhancement)

This would promote complex and diverse habitat types for fish in this stream. Currently there are moderate to large amounts of LWD, but the majority of this material is older wood. Large woody debris dropped into the stream channels would enhance and preserve habitat complexity for fish until natural mortality of trees recruit more large woody debris. Small, short-term increases in turbidity are likely due to bank scouring. However, increases in turbidity would be very short-term and a very small amount due to vegetation on stable banks. This increase in turbidity would likely settle out just down stream due to the low depositional nature of this stream. Immediate benefits to fish habitat would occur in this reach. Logs would provide structure for in-stream diversity, slow water velocity, create pools, increase pool depth and trap gravels for spawning habitat. Pools formed by structures would provide summer and winter rearing habitat and hiding cover. Deeper pools would reduce water temperature during low summer flows. The structures would also slow the velocity of winter flow so small fry would not be prematurely washed down stream.

Alternative 2 (Reduced Road Reconstruction, Elimination of Culvert Installations and Additional New Road Construction – Applies to Project 1)

Approximately 1,000 additional feet of new ridge top road (P3) would be constructed in Unit 11A. Approximately 1,650 feet of reconstruction (R2) and two culvert installations (R2) would not occur. 130 acres of the treatment area would be skyline yarded and 47 acres would be yarded using a ground-based system.

This alternative would have essentially the same impact to the aquatic environment and its organisms with the exception of the culverts that would not be placed. These culverts would have a short term minor increase in turbidity. The increase in road miles would not have an impact due to the location of the new road construction (Ridge Top).

Alternative 3 (No action)

Continued habitat and aquatic conditions would occur. No short term increase in turbidity would occur from culvert placements. No increase in road drainage would occur from placing cross drains. Riparian areas would not be changed from current condition.

H. FUELS/AIR QUALITY

Affected Environment

The project area is presently occupied by fairly continuous stands of second growth Douglas fir timber with varying minor components of western hemlock, western red cedar, noble fir, big leaf maple and red alder trees. Stand ages average about 40 to 65 years of age. Undergrowth is a moderate growth of: salal, Oregon grape, vine maple, ocean spray and red and blue huckleberry. There is moderate to heavy accumulation of dead woody material on the ground. There are many large old down logs left from the previous logging. Small snags are fairly numerous and scattered through the stand. Large snags (over 20 inches dia.) are less than 2 per acre. Based on visual estimates; using GTR-PNW-105, series 2-MC-2, 3-MC-2, 1-MC-4 and 2-MC-4. The estimated total dead fuel loading for these stands varies from 11 to 43 tons per acre range. Fuel model for these sites would be combinations of model 8 - closed timber litter and model 11 - medium logging slash. Much of the existing down pole to log size material is rotten or only partially sound.

Fuels: Environmental Consequences

Alternative 1 (Proposed Action)

Project 1 (Commercial Thinning and Density Management)

Fuel loading and fire risk would increase at this site as a result of the proposed action for the following reasons.

Vegetation cleared for road construction, renovation and reconstruction, would result in creation of approximately 15 to 20 tons of slash that would be scattered and/or piled along the right-of-way. Most of this material would end up being piled and burned following harvest operations and some would remain scattered in and adjacent to the right of way. This would slightly increase risk for a fire start along the right of way while the roads are in use but following completion of logging all concentrations and piles would be covered and later burned. After the project has been completed and the piles burned, the increase in fire risk would be reduced.

The increase in slash created by the proposed thinning would result in a higher risk of fire on the thinned sites following logging. The increase in fuel loading is expected to be 5 to 15 tons per acre, with a discontinuous arrangement. Total dead fuel loadings would range from approximately 15 to 35 tons per acre. The highest fuel loadings would be scattered through the site depending on the distribution of trees cut with the various prescriptions.

The overall rating of fire intensity following this action would be moderate. This is due to the moderate topography, the isolated nature of most of the slash from the roads, the continued existence of a tree canopy shading the fuels, and the higher humidity associated with riparian areas.

Risk of fire would be greatest during the period when attached needles dry out the first season following cutting. These "red needles" generally fall off within one year and fire risk greatly diminishes. Fire risk would continue to diminish as the area greens up and the fine twigs and branches begin to break down. Burning of landing piles and slash concentrations along roads would reduce risk of a fire start from human ignition sources.

Burning of piles would be done in the fall under good atmospheric mixing conditions so the threat of impacting air quality in designated areas would be very low. Any residual smoke should be of short duration and occur during a period of the year when there is less outdoor activity.

Project 2 (Fish habitat enhancement)

The proposed project could slightly increase fuel loading and risk of fire spread and intensity after trees are on the ground. The creation of dead fuels from the tree crowns would pose a minor increase in risk but this is expected to diminish within a few years. Most of the project activity would occur in isolated areas away from roads or trails or other points of human activity.

Alternative 2 (Reduced Road Reconstruction, Elimination of Culvert Installations and Additional New Road Construction – Applies to Project 1)

An additional 15 to 25 tons of slash would be created from right-of-way clearing for the additional 1,000 feet of new road construction. This would slightly increase risk for a fire start along the right of way while the road is in use but following completion of logging all concentrations and piles would be covered and later burned. After the project has been completed and the piles burned, the increase in fire risk would be insignificant.

Alternative 3 (No Action)

With a no action alternative there would be no change from the current conditions for the soil or fuels resources. Conditions would remain as they are at present. No changes in aerial extent of disturbed soil or fuel loadings.

IV. CONSULTATION

Fish: Consultation with NOAA Fisheries is required for projects that 'may affect' listed species. A determination has been made that this proposed project would have 'no effect' on Coastal Coho ***(Oncorhynchus kisutch).*** Generally, the 'no effect' determination is based on the distance upstream of project activities from ESA listed fish habitat (approximately 9 miles), and project design criteria that include no harvest activity within stream protection zones and post-project leave tree densities of 34-88 trees per acre.

Terrestrial Wildlife: The Little Boulder Creek Thinning was submitted for consultation to the U.S. Fish and Wildlife Service (FWS) on July 24, 2002. A final Biological Opinion (# 1-7-02-F-958) on this consultation was received September 30, 2002. The proposed action is considered a "may affect, not likely to adverse affect" northern spotted owl dispersal habitat.

Public Notification

- A legal notice announcing availability of the EA for public review and comment will be submitted to the *Dallas Itemizer*. Letters with the same information will be mailed to interested individuals.
- Copies of the EA will be mailed to interested individuals, interest groups and agencies.
- The EA and FONSI will be made available for review on the internet at Salem BLM's website, http://www.or.blm.gov/salem/ (Planning).

V. INTERDISCIPLINARY TEAM MEMBERS

Gary Humbard	Logging System/Layout	8/25/03 GLH
Gary Licata	Wildlife	8/25/03 DM for G.L.
Russ Buswell	Road Engineering	8/26/03 S.C. for R.B.
Tom Tomczyk	Soil/Fuels	8/25/03 DM for T.T.
Ron Exeter	Botany	"Aug 25, 2003 R.E.
Hugh Snook	Forest Ecology	8/27/03 H.W.S.
Tom Vanderhoof	Cultural	TMV 8/25/03
Steve Liebhardt	Fisheries	SL 8/25/03
Ashley La Forge	Hydrology	8/25/03 DM for A.L.
Diane Morris	Silviculture	DMM 8/25/03
Amy Haynes	Riparian Ecology	AH 8/25/03

NEPA Review: Carolyn Sands Date: 8/27/03

APPENDIX A: PROJECT MAPS

Map 1: Project Map (Alternatives 1 and 2)
Map 2: General Vicinity Map

June 16, 2003

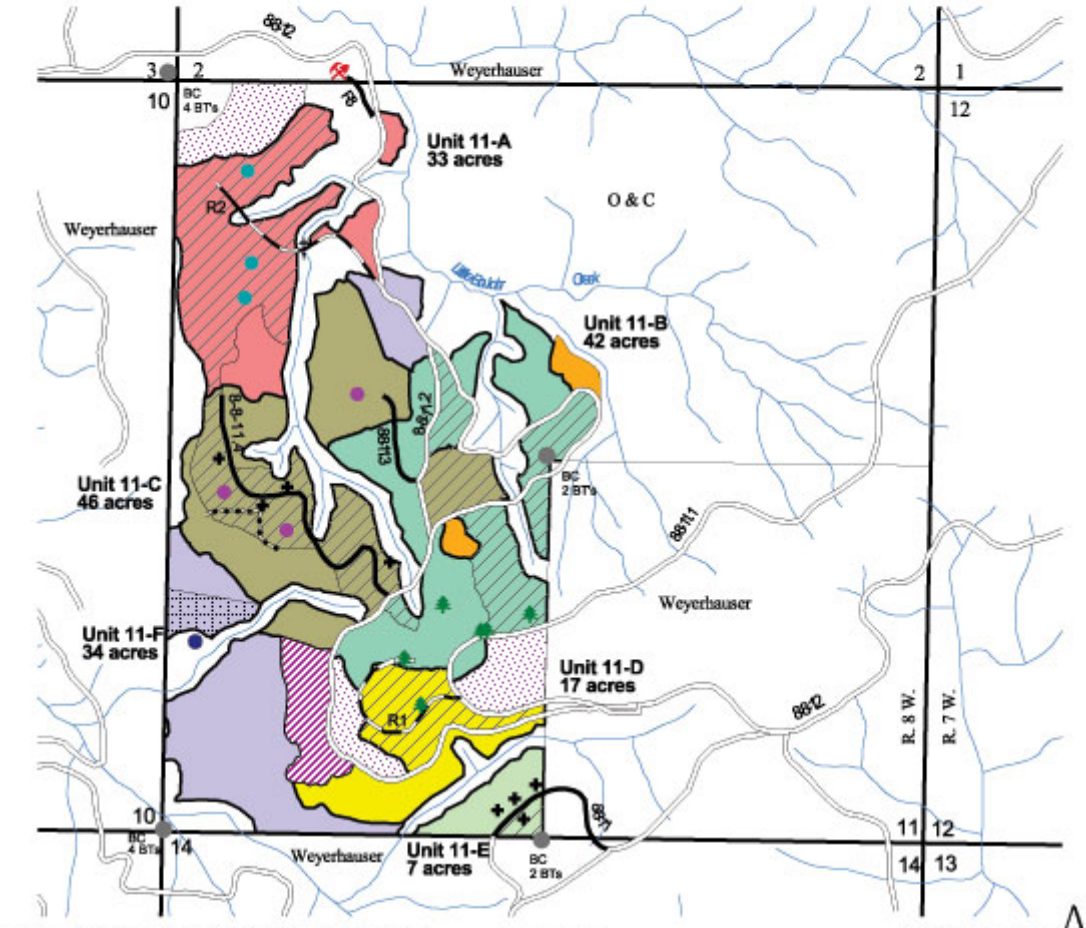
United States Departement of the Interior
BUREAU OF LAND MANAGEMENT

A2

Alternative 1 LITTLE BOULDER CREEK THINNING EA MAP

FY 2002

T. 8 S., R. 8 W., Section 11, W. M. - SALEM DISTRICT - OREGON



Note: Unit acres do not include existing or new roads.

Scale: 1" = 1,000'

N

LEGEND

- Corner found
- Laminated Root Disease
- Patch Cut
- Superior tree
- NW Christmas Tree
- Quarry to be enlarged
- Wash out (culvert to be installed)
- Marsh
- Streams
- Existing Road
- New Construction
- Reconstruction
- Road to be Renovated
- Area in which skyline yarding would be allowed (Reserve Area)
- Ground-based yarding
- Skyline yarding
- Special yarding area
- EA Unit Boundaries
- Unit 11-A
- Unit 11-B
- Unit 11-C
- Unit 11-D
- Unit 11-E
- Unit 11-F
- Deferred Area - Adequate Stocking
- Fungi Protection Area

June 16, 2003

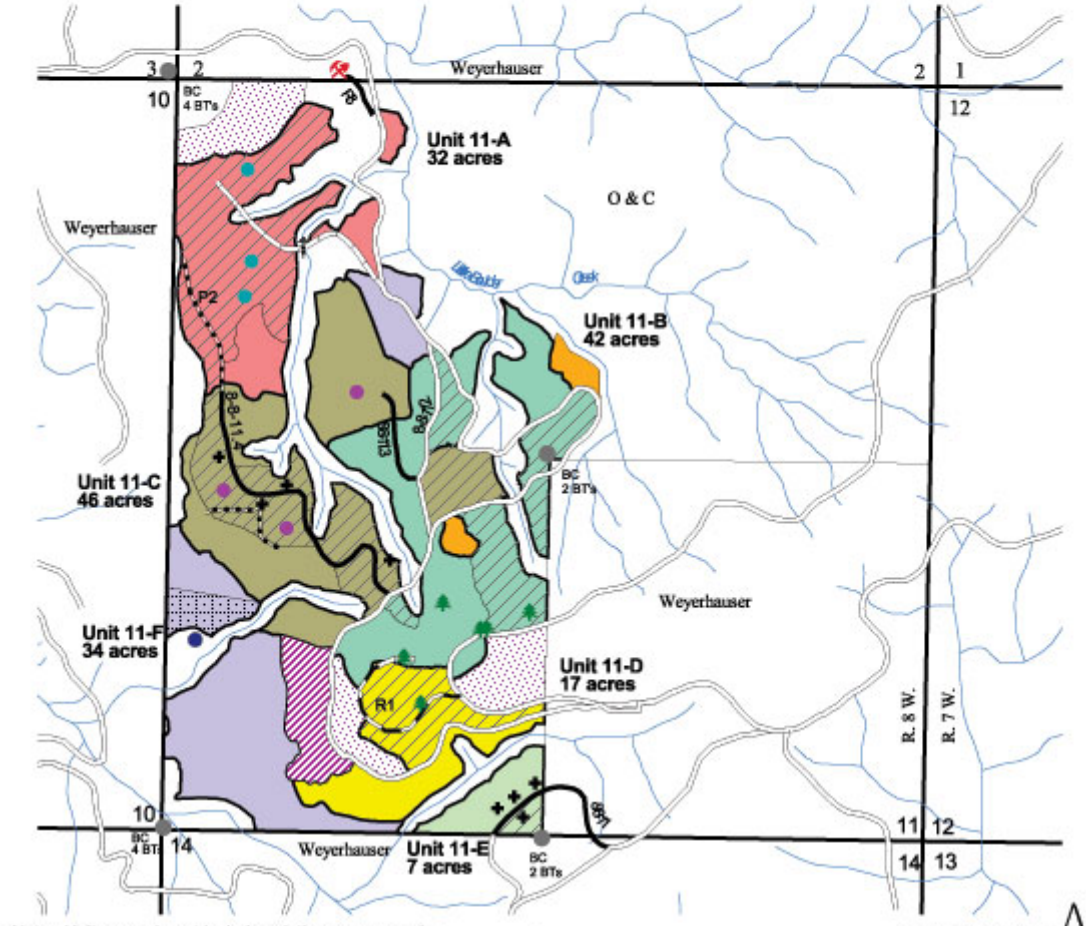
United States Departement of the Interior
BUREAU OF LAND MANAGEMENT

A3

Alternative 2 LITTLE BOULDER CREEK THINNING EA MAP

FY 2002

T. 8 S., R. 8 W., Section 11, W. M. - SALEM DISTRICT - OREGON



Note: Unit acres do not include existing or new roads.

Scale: 1" = 1,000'

LEGEND

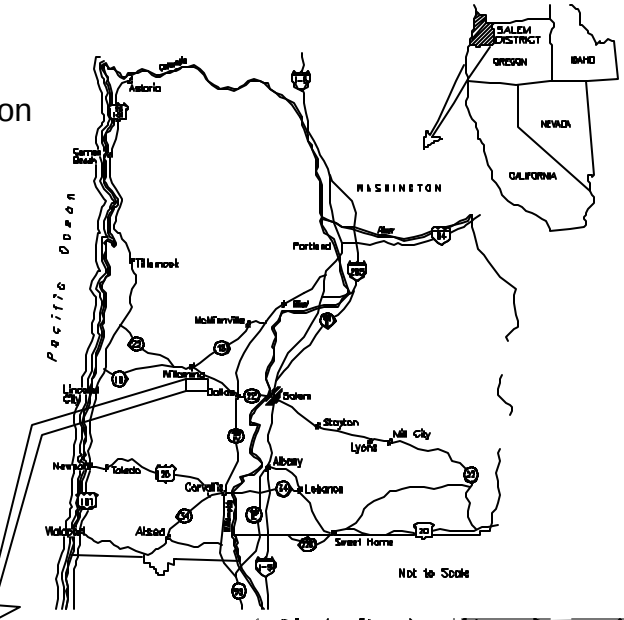
- Corner found
- Laminated Root Disease
- Patch Cut
- Superior tree
- NW Christmas Tree
- Quarry to be enlarged
- Wash out
- Marsh
- Streams
- Existing Road
- Overgrown or Impassable Road
- New Construction
- Reconstruction
- Road to be Renovated
- Area in which skyline yarding would be allowed (Reserve Area)
- Ground-based yarding
- Skyline yarding
- Special yarding area
- EA Unit Boundaries
- Unit 11-A
- Unit 11-B
- Unit 11-C
- Unit 11-D
- Unit 11-E
- Unit 11-F
- Deferred Area - Adequate Stocking
- Fungi Protection Area

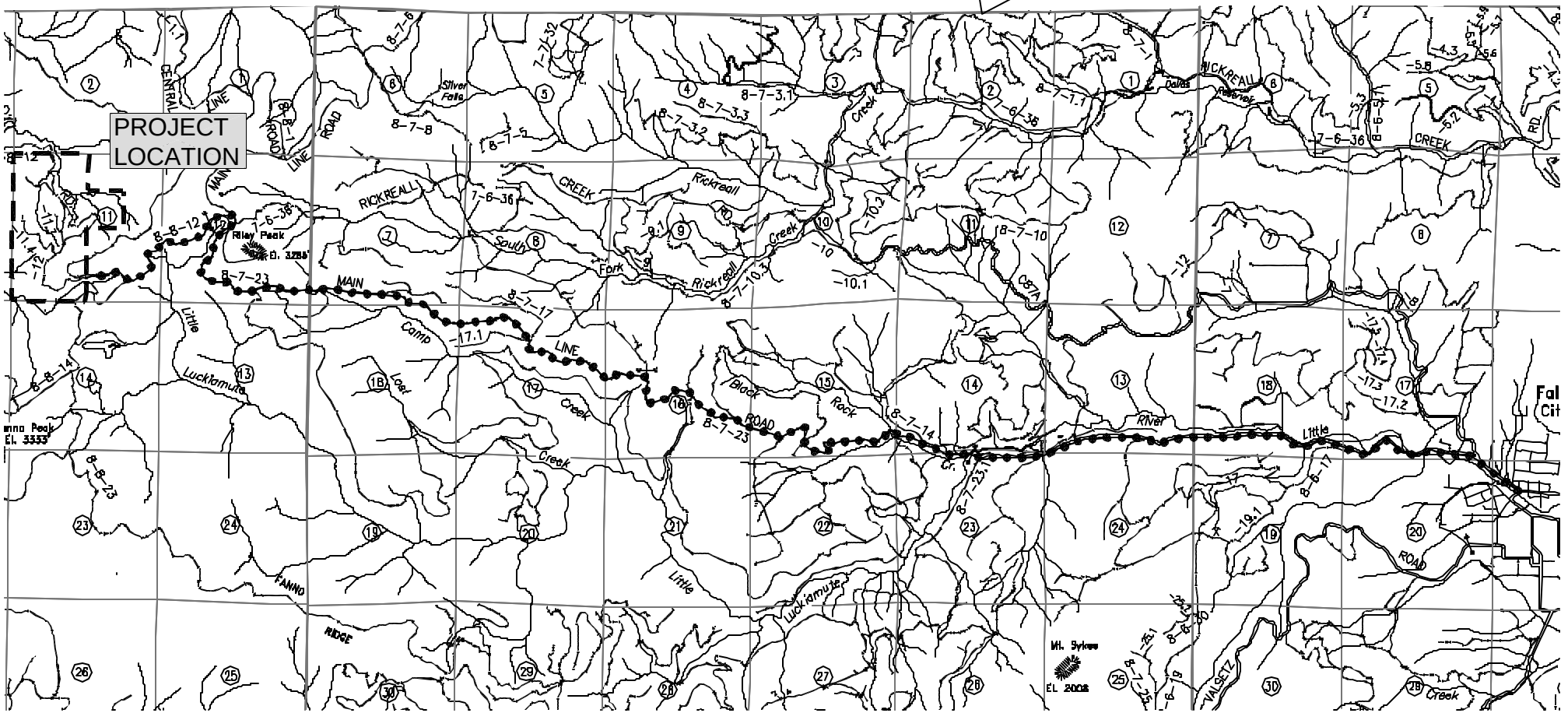
BUREAU OF LAND MANAGEMENT
LITTLE BOULDER CREEK
Section 11, T. 8 S., R. 8 W. - Salem District - Oregon

GENERAL VICINITY MAP

Contract Area

Access Route





APPENDIX B: REVIEW SUMMARIES

Critical Elements of the Human Environment: The following table summarizes environmental features which the Bureau of Land Management is required by law or policy to consider in all Environmental Documentation (BLM Handbook H-1790-1, Appendix 5: Critical Elements of the Human Environment).

Environmental Feature	Affected/Not Affected/	Remarks
Air Quality	Affected	Pile burning would be accomplished in compliance with the Oregon Smoke Management Plan. See fuels/air quality section of Chapter III.
Areas of Critical Environmental Concern	Not Affected	Not in or adjacent to an ACEC.
Cultural, Historic, Paleontological	Not Affected	Post survey would be completed as stated in Protocol for Managing Cultural Resources on Lands Administered by the BLM dated August 5, 1998 in Oregon; Appendix D.
Prime or Unique Farm Lands	Not Affected	
Flood Plains	Not Affected	
Native American Religious Concerns	Not Affected	
Threatened, Endangered, or Special Status Plant Species or Habitat	Affected	No known sites found. See Vegetation, Special Status/Attention Species section of Chapter III
Threatened, Endangered, or Special Status Animal Species or Habitat	Wildlife: Affected Fish: Not Affected	USF&W consultation completed. Terms and conditions of BO # 1-7-02-F-958 incorporated into project design features. See wildlife section of Chapter III.
Hazardous or Solid Wastes	Not Affected	None on site nor created by proposed action.
Water Quality (Surface and Ground)	Affected	Chapter III

Environmental Feature	Affected/Not Affected/May Be Affected	Remarks
Wetlands or Riparian Reserves	Affected	See Aquatic Conservation Strategy (Appendix C)
Environmental Justice	Not Affected	
Invasive, Nonnative Species	Affected	Chapter III
Wild and Scenic Rivers	Not Affected	No Wild and Scenic Rivers in project area.
Wilderness	Not Affected	No Wilderness in project area.
Adverse Energy Impact	Not Affected	

Other Elements of the Environment: This table lists other elements of the environment, which are subject to requirements specified in law, regulation, policy, or management direction, and the predicted environmental impact per element if the action alternatives were implemented.

Environmental Element	Affected/ Not Affected	Remarks
Land Uses (Including mining claims, mineral leases)	Not Affected	The proposed action is not predicted to interfere with the land uses at the site.
Recreation	Not Affected	
Soils	Affected	See soils section of Chapter III
Visual Resources	Not Affected	
Water Resources (including ACS, beneficial uses, etc)	Affected	See Water/Riparian section of Chapter III, Aquatic Conservation Strategy table, and Beneficial Uses table.
Special Status and SEIS special attention plant species/habitat (excluding T/E)	Not Affected	See Chapter III
Special Status and SEIS special attention aquatic wildlife species and Essential Fish Habitat	Not Affected?	
Special Status and SEIS special attention terrestrial wildlife species/habitat (excluding T/E)	Not Affected	See Chapter III
Rural Interface Areas	Not Affected	
Coastal Zone (effect on "any land or water use or natural resource of the "coastal zone")		

Appendix C - Aquatic Conservation Strategy Objectives Review Summary

(Note - See RMP pg 5-6 for more detailed explanations of the ACS objectives)

ACS Objective	How Project Meets the ACS Objective
1. Maintain and restore distribution, diversity, and complexity of watershed and landscape features to ensure protection of aquatic systems.	The largest seral stage in the Upper Siletz watershed is in conifer stands less than 80 years old. These stands account for approximately 70% of the Riparian Reserves in the watershed. Most of them were logged and planted or allowed to seed in, and are generally uniform, even-aged Douglas-fir stands. (*Upper Siletz Watershed Analysis*, *USWA* p. 48*)*. The *USWA* (p.121 and Map 14) identifies the proposed project area as a potential treatment area. The watershed currently has reduced structural diversity and species composition (p.39); lacks late seral/old growth habitat; and lacks coarse woody debris in mid-seral stands (p.91). The proposed density management in the Riparian Reserves would be a means to enhance late-successional forest conditions and speed up attainment of these conditions across the landscape. Since Riparian Reserves provide travel corridors and resources for aquatic, riparian dependant and other riparian and/or late-successional associated plants and animals, the increased structural and plant diversity would ensure protection of aquatic systems by maintaining and restoring the distribution, diversity and complexity of watershed and landscape features. **Project 2:** Felling trees into Little Boulder Creek and its tributary would allow habitat conditions to increase in complexity and diversity for resident fish , thereby restoring distribution, diversity and complexity of watershed and landscape features (EA p.47),
2. Maintain and restore spatial connectivity within and between watersheds.	Long term connectivity of terrestrial watershed features would be improved by enhancing conditions for understory development (structural diversity), increasing the proportion of minor species in the stand (species diversity), increasing growth rates on remaining trees and creating fresh snags and down wood. In time, these reserves would improve in functioning as refugia for late successional, aquatic and riparian associated and dependent species. In the short term, the fresh snags and down wood created by the project would begin to mitigate the lack of snags and down wood in the watershed. No stream crossing culverts would be used that would potentially hinder movement of aquatic species; therefore no aquatic barriers would be created. Both terrestrial and aquatic connectivity would be maintained, and over the long-term, as Riparian Reserves develop late successional characteristics, lateral, longitudinal and drainage connectivity would be restored. **Project 2:** Fish habitat and fish passage would be enhanced in the project area, increasing movement up and downstream for fish, and therefore increasing aquatic connectivity within and between watersheds.

ACS Objective	How Project Meets the ACS Objective
3. Maintain and restore physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.	A no cut stream protection zone (SPZ) would maintain the integrity of shorelines, banks and bottom configurations. Criteria used to designate buffers were riparian vegetation, significant slope breaks, active floodplain or high water tables, and areas contributing to stream shading. All buffers are a minimum of 50 feet. Trees would be directionally felled within one tree height of the buffers and any part that falls within the buffers would not be yarded out (EA p. 15), thereby preventing disturbance to stream banks and bottom configurations. In the short term, this proposal is unlikely to alter the current conditions of channels in the project area, with the exception of the culvert installations. Culvert installation would necessitate onsite modifications to the stream channel and stream banks, however these modifications would not decrease long term stream bank stability and may even improve channel function over current conditions (EA, p. 37). Over the long term, reductions in stand density will likely increase riparian forest health and tree size. This will lead to increased large wood recruitment for stream channels, an important factor in proper channel function. Additional large wood in project area channels would ultimately slow stream velocity, increase retention of organic material, capture bedload, and improve aquatic habitat. (EA p. 37) Management activity throughout the project area is not likely to cause any alteration in water flows that could affect channel morphology. **Project 2:** The channel reach of Little Boulder Creek which passes through the project area is currently lacking in large wood and is entrenching. The addition of large wood into the channel may help to stabilize the channel banks by encouraging substrate attrition and restoring channel function (EA p. 40).

ACS Objective	How Project Meets the ACS Objective
4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems.	Stream temperature: This proposal is unlikely to have any measurable effect on stream temperatures in the project area watersheds. Forest stand density and hence, shading within stream buffers and adjacent to streams in the project area would be left virtually unaltered under this proposal. Almost all project area streams are headwater streams, having their origins within or just outside the sale boundary. Close to these groundwater/surface water interfaces, stream temperatures are relatively insensitive to changes in stream temperature and are consistently well below ODEQ temperature standards (EA, p. 37) Sedimentation and stream turbidity: Some increases in sedimentation (and resulting increases in turbidity) can be expected during culvert installation, as equipment is operating in the stream channel. However, such increases are likely to be of local extent and of short duration. All timber hauling and road construction would be restricted if necessary to avoid excessive increases in sedimentation. Additionally, improvements to existing roads would occur prior to hauling and would be ongoing as needed during the project. The small number of trees being yarded would limit surface disturbance due to yarding to minimal levels, and high levels of residual slash left on yarding corridors would reduce runoff by deflecting and redistributing overland flow laterally to areas where it would infiltrate into the soil (EA, p. 36). Additionally, stream protection zones would act as vegetative buffers, absorbing and deflecting overland flow before it reaches streams. **Project 2:** Small short term increases in turbidity are likely due to bank scouring during the felling of trees into the stream. However, increased in turbidity would be very short term and a very small amount due to vegetation on stable banks. This increase in turbidity would likely settle out just down stream. In the long term, the addition of logs to the stream would enhance sediment storage.
5. Maintain and restore the sediment regime under which system evolved.	Best management practices (BMPs) and mitigation measures would be implemented to eliminate and/or limit acceleration of sediment delivery to streams in the project area. Tree removal would not occur on steep, unstable slopes where the potential for mass wasting adjacent to stream reaches is high. Therefore, increases in sediment delivery to streams due to mass wasting are unlikely to result from this action (EA, p. 34). See also Objective 4, above. Project design features would maintain the physical integrity of the hillslopes and channel; no alteration of the current sediment regime is expected. **Project 2:** See Objective 4 above.

ACS Objective	How Project Meets the ACS Objective
6. Maintain and restore instream flows.	Alterations in the capture, infiltration and routing (both surface and subsurface) of precipitation as a consequence of the mechanical removal of trees and reduction in stand density, has been documented on watersheds in the Pacific Northwest and other parts of the world. Studies cited in the EA (p.34) determined that reductions in forest cover of less than 20 percent cannot be detected by measuring stream flow using the "hydrometric method". The proposed action would affect a total of approximately 0.5 percent of the watershed's forest cover. Therefore, it is unlikely to produce any measurable increase in stream flows. This action was analyzed for its potential contribution to cumulative effects to stream flow in the two catchments (7th fields) of Little Boulder and Rogers Creek. The analysis can be found in the EA on page 38. Project 2 The direct, indirect and cumulative effects to project area hydrology would be similar to the rest of the proposed action, with the exceptions (noted above in Objective 4 and 5) of effects to the channel condition of the streams that logs are felled into.
7. Maintain and restore the timing, variability and duration of floodplain inundation and water table elevation in meadows and wetlands.	The proposed thinning would not alter existing patterns of floodplain inundation or water table elevation as it would have no effects or only negligible short-term negative effects on existing flow patterns and stream channel conditions. Over the long term, reductions in stand density would likely increase riparian forest health and tree size. This would lead to increased large wood recruitment for stream channels, an important factor in proper channel function. Additional large wood in project area channels would ultimately slow stream velocity, increase retention of organic material, capture bedload, and improve aquatic habitat. (EA p. 37). There are no meadows or wetlands in the proposed project area. Project 2 Over the long term, the proposed project would likely slow stream velocities, increasing sedimentation and raising the channel bed level (EA p. 39), which could eventually reverse the current entrenchment and increase stream access to its floodplain. This would be a restoration of floodplain inundation. There are no meadows or wetlands in the project area.

ACS Objective	How Project Meets the ACS Objective
8. Maintain and restore the species composition and structural diversity of plant communities in riparian zones and wetlands to provide thermal regulation, nutrient filtering, and appropriate rates of bank erosion, channel migration and CWD accumulations.	The actual riparian areas (as defined by criteria in EA, Appendix F) along streams would be excluded from treatment, by designating stream protection zones, and only the upslope portions of the Riparian Reserves would be included in the density management treatment. All trees would be directionally felled away from streams within one tree height of stream protection zones and if a cut tree does fall within a stream protection zone, that part of the tree would remain (EA p. 15). Stream protection zones and residual trees would continue shading streams. Structural components of late-seral forests (large trees, multiple canopy layers, large hard snags, heavy accumulations of down wood, and species diversity) are generally lacking in the young stands surrounding and including the project area In addition to protecting actual riparian vegetation, the proposed project would restore the species composition and structural diversity of plant communities by enhancing conditions for understory development (structural diversity), increasing the proportion of minor species in the stand (species diversity), increasing growth rates on remaining trees and creating fresh snags and down wood. **Project 2:** There would be little or no change to riparian vegetation on banks or within the riparian zone along streams resulting from the proposed project.
9. Maintain and restore habitat to support well distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species	Habitat to support well distributed riparian-dependent and riparian associated species would be restored by reducing overstocked stands, moderating tree species diversity, altering forest structural characteristics and amending coarse woody debris conditions. Thinning within the Riparian Reserves would enhance stand conditions, growing trees faster than if the stand were to grow naturally. This would increase the potential for high quality instream large woody debris. (EA p. 41) Species linked to Riparian Reserves issues are mostly associated with late-seral forest conditions, which would be enhanced within this stand with negligible affects to existing function of the local Riparian Reserves corridors. Development of stand and individual tree characteristics desirable for riparian and old growth associated species would be accelerated by restoring structural complexity to the stands and by accelerating development of desired tree characteristics (increased diameter and increased crown depth/width) (EA p. 22). **Project 2:** The proposed project would promote complex and diverse habitat types for fish in Little Boulder Creek (EA p. 47). The addition of logs to the stream would also serve as habitat for amphibians and aquatic insects (EA p. 42).

Appendix D to EA# OR080-01-16 Little Boulder Creek

BENEFICIAL USES REVIEW SUMMARY		
Downstream Beneficial Uses (Salem FEIS 3-9)	**Desig-nated Use (Y/N)?**	**Remarks /References**
Public Water Supply	N	WRIS
Domestic Water Supply	N	WRIS
Irrigation	Y	See EA p.33
Fisheries	Y	See EA p.33
Wildlife	Y	See wildlife report.
Recreation	Y	See EA p.33
Maintenance of Aesthetic Quality	Y	See EA p.33
OTHER WATER ISSUES		
Issue/Concern	**Listed (Y/N)**	**Remarks /References**
DEQ 303d listed stream	N	
Water Quantity	N	
Key Watershed	N	

*WRIS = Oregon Department of Water Resources

APPENDIX E: GUIDELINES TO REDUCE BARK BEETLE MORTALITY

The following guidelines (from Hostetler, B. and D. Ross. 1996. *Generation of Coarse Woody Debris and Guidelines for Reducing the Risk of Adverse Impacts by Douglas-fir Beetle*. Westside Forest Insect and Disease Technical Center. Unpublished.) should be followed to reduce the probability of Douglas-fir bark beetle (DFB)-caused mortality in residual standing trees in westside forests where live Douglas-fir are being cut for CWD.

Fell and leave the minimum number of trees possible that would allow achievement of CWD objectives. Remember, the rule-of thumb is that the number of standing trees killed would be about 60 percent of the number that are felled.

Fell the trees no earlier than July and no later than the end of September – the later they can be felled during this period, the better. This would help insure that the trees are felled after the primary flight of DFB and that some drying of logs would occur so that the logs would be less suitable as host material the following spring.

Staggering the years in which trees are being felled may be beneficial if large numbers of trees are being felled and if enough time is left between felling. The time period between tree falling should be at least three years; four would be better. Otherwise, the situation may be exacerbated by allowing beetles to build to even higher population levels.

Monitor what is happening in these stands regarding infestation of down logs and infestation and killing of standing live Douglas-firs. To date, no data have been collected from areas where silvicultural practices such as this have been used, and any information gathered would be useful under the principles of adaptive management.

If DFB populations are at high levels in the general area because of large amounts of recent blowdown, it would be prudent to postpone felling of CWD trees until populations subsided. This would be two years from the summer in which many discolored trees are present (or four years after the first spring following the blowdown), unless there are large amounts of blowdown in subsequent years. If this is the case, one should wait longer. Once the infested trees discolor, the extent and intensity of the previous year's DFB activity can be estimated using the Annual Aerial Insect Detection Survey maps.

If possible, fell tree species other than Douglas-fir for CWD.

APPENDIX F: CRITERIA FOR IDENTIFYING NO-CUT STREAM BUFFERS

1) A 50 foot minimum buffer would be flagged to exclude the following areas based on field identified features (whichever is greatest). Activities may occur in this area, but material would not be removed and heavy machinery or equipment would not be allowed.

a. Slope break- point below which the slope is actively eroding and contributing sediment to the stream.

b. Floodplain- flat, accessed by the stream once in a blue moon.

c. Stream banks- feature which contains the "active" stream channel.

d. High water tables- flat, mushy soils, skunk cabbage, standing water, etc..

e. Flood prone- 2 x max depth @ bankfull (for streams with none of the above).

2) "Minimum" would be modified based on associated issues or field identified risks. Examples include-

a. Perennial streams at risk for temperature increases due to the action (i.e., southern aspect, low topographic relief, vegetation provides significant shading). We can either extend the minimum to 100 feet at these sites or apply a model to get more precision in our estimate.

b. Unstable slopes- this is open to discussion. We may want to thin along debris torrent prone headwater channels even though they are potentially "unstable" because these areas are significant LWD source areas. However, actively eroding sites adjacent to streams with ravel on the surface and "jack-strawed" trees may be excluded.

c. "Sensitive" streams- sand bed channels or channels with high residual impacts (bank erosion, incision, heavy fine sediment load, etc) may warrant extra protection.

Appendix G: Comparison of Environmental Consequences, by Alternative, for Identified Environmental Elements

Environmental Element	Alternative 1	Alternative 2	Alternative 3
Vegetation	Reduces stand density ranging from 34 trees per acre (TPA; Unit 11C) to 88 TPA (Unit 11A). Increase the amount of light penetrating the canopy. Increased light levels would promote growth and development of vegetation found at mid-canopy and ground levels. Understory initiation of shade-tolerant conifers would be promoted in areas of increased light. In the interim, a more complex understory would develop, consisting of more shrub species and planted conifers. Residual trees would increase in diameter and crown depth/width. Limb diameter on large limby trees would be maintained by releasing those trees to an open grown condition. The long-term results of density management would be larger average diameter breast height (DBH), and larger crowns (higher crown ratios) at any given age.	Reduces stand density the same as alternative 1. Opening up the canopy would cause the same ground level micro-climatic changes as outlined in Alternative 1.	Stand densities remain the same. Stand mortality due to competition increases, as does long term decrease of stand health and stability. Decreased opportunity for understory initiation, short term increased structural complexity or species diversity.

Environmental Element	Alternative 1	Alternative 2	Alternative 3
Soils	Total acreage of soil disturbance from road building and logging are estimated to be 5.3 percent of the sale area, below 10 percent allowable in RMP. Although not totally restoring the soil, the proposed road decommissioning would partially mitigate some of the negative soil impacts thus reducing the total cumulative impacted acres	Approximately the same disturbance as Alternative 1.	No change from current conditions.
Water/Riparian	No measurable affect on physical integrity, water quality, sediment regime or in-stream flows. Short-term, variable increase in stream turbidity may occur. Riparian zone protected by 50 ft. no-entry buffer. Enhance structural and species diversity, restore riparian ecosystem functions.	Same as Alt. 1 only with minimal sediment input potential by not installing 2 instream culverts. Same as Alt. 1.	Continuation of current conditions and trends. Single canopy stands lacking structure and species diversity. May take 45 years to attain understory.

Environmental Element	Alternative 1	Alternative 2	Alternative 3
Wildlife	Spotted owls and marbled murrelets not affected. Negligible cumulative impact on habitat availability for species of concern resulting from past BLM thinning harvests and foreseeable thinning treatments. Short term reduction of canopy closure. Minor reduction and disturbance to existing CWD. Creation of new hard CWD of optimal size and quality. Retention, enhancement and extended persistence of hardwood tree and shrub diversity. Transition in structural characteristics of the treated stands to more closely resemble late-seral forest habitat.	The anticipated impacts to wildlife species resulting from changes to forest structure are the same as discussed for the proposed action.	Continuation of current habitat conditions and trends.
Fisheries	No effect to local or anadromous fish and fish habitat. Long term increase in recruitment of high quality LWD	Same as Alt. 1 except 2 culverts would not be installed thus reducing short term minor increase in turbidity. Increase in road construction would not have adverse impact to fish.	Continuation of current habitat conditions and trends. No sediment input. No effects to resident fish. No effects to aquatic ecosystem.
Fuels/Air Quality	Higher short term risk of fire due to increase in slash. Overall risk would be moderate.	15 to 25 tons of slash created from additional road construction.	Short term conditions would remain the same.

APPENDIX H: Summary of Seasonal Restrictions for Proposed Project Activities

Activity	**Operational Time lines** [1]
Felling	Available: June 16- April 14; Conditional: April 15 - June 15
Road Building	Available: Generally, May 1 - Oct. 31
Hauling	Available: Generally, April 1 - Dec. 1
Skyline Yarding	Available: June 16 - Apr 14; Conditional: April 15 - June 15
Ground-based Yarding (Harvester/Forwarder)	Available: July 15 - Oct 15; Not Allowed: Oct 16 - July 15
Ground-based Yarding (tractor)	Available: Aug 1 - Oct 15; Not Allowed: Oct 16 - July 31
Power Equipment [2]	Daily use restricted to period beginning two hours after sunrise and ending two hours before sunset, from April 1 to September 15; State fire danger rules apply during fire season; no seasonal restriction intended.
In-stream work (culvert installation)	Available Generally July 1 to Aug. 31.
Blasting	Available: Oct 1 – Dec 31
Prescribed Burning	Available: Aug 6- Mar 31; Not Allowed: Apr 1 - Aug 5

1. **Operational Time Periods**: Available = time period an activity is allowed; Not Allowed = time period that an activity is **NOT** allowed; Conditional = time period that conditional operation is allowed (see Design features for Soils, Wildlife, Fuels/Air Quality).
2. Power Equipment is intended to mean all motor driven equipment (e.g., chainsaws, yarder, track vehicles, helicopter) that produce noise above normal forest ambient levels.

Appendix I

Table 1-1. Species Included in Survey and Manage Standards and Guidelines and Category Assignment (June 2002)	
TAXA GROUP ***Species***	<u>*Note*</u>: Where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses) is name used in NFP (Table C-3).	**Category**
FUNGI	
Acanthophysium farlowii (Aleurodiscus farlowii)	B
Albatrellus avellaneus	B
Albatrellus caeruleoporus	B
Albatrellus ellisii	B
Albatrellus flettii, In Washington and California	B
Alpova alexsmithii	B
Alpova olivaceotinctus	B
Arcangeliella camphorata (*Arcangeliella* sp. nov. #Trappe 12382; *Arcangeliella* sp. nov. #Trappe 12359)	B
Arcangeliella crassa	B
Arcangeliella lactarioides	B
Asterophora lycoperdoides	B
Asterophora parasitica	B
Baeospora myriadophylla	B
Balsamia nigrens (Balsamia nigra)	B
Boletus haematinus	B
Boletus pulcherrimus	B
Bondarzewia mesenterica (Bondarzewia montana), In Washington and California	B
Bridgeoporus nobilissimus (Oxyporus nobilissimus)	A
Cantharellus subalbidus, In Washington and California	D
Catathelasma ventricosa	B
Chalciporus piperatus (*Boletus piperatus*)	D
Chamonixia caespitosa (*Chamonixia pacifica* sp. nov. #Trappe #12768)	B
Choiromyces alveolatus	B
Choiromyces venosus	B
Chroogomphus loculatus	B
Chrysomphalina grossula	B
Clavariadelphus ligula	B
Clavariadelphus occidentalis (*Clavariadelphus pistillaris*)	B
Clavariadelphus sachalinensis	B
Clavariadelphus subfastigiatus	B
Clavariadelphus truncates (syn. *Clavariadelphus borealis*)	D
Clavulina castanopes v. *lignicola* (*Clavulina ornatipes*)	B
Clitocybe senilis	B
Clitocybe subditopoda	B
Collybia bakerensis	F
Collybia racemosa	B
Cordyceps ophioglossoides	B
Cortinarius barlowensis (syn. *Cortinarius azureus*)	B
Cortinarius boulderensis	B
Cortinarius cyanites	B

Table 1-1. Species Included in Survey and Manage Standards and Guidelines and Category Assignment (June 2002)	
TAXA GROUP *Note*: Where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses) is name used in NFP (Table C-3). ***Species***	**Category**
Cortinarius depauperatus (*Cortinarius spilomeus*)	B
Cortinarius magnivelatus	B
Cortinarius olympianus	B
Cortinarius speciosissimus (Cortinarius rainierensis)	B
Cortinarius tabularis	B
Cortinarius umidicola (Cortinarius canabarba)	B
Cortinarius valgus	B
Cortinarius variipes	B
Cortinarius verrucisporus	B
Cortinarius wiebeae	B
*Craterellus tubaeformis (*syn. *Cantharellus tubaeformis)*, In Washington and California	D
Cudonia monticola	B
Cyphellostereum laeve	B
Dermocybe humboldtensis	B
Destuntzia fusca	B
Destuntzia rubra	B
Dichostereum boreale (Dichostereum granulosum)	B
Elaphomyces anthracinus	B
Elaphomyces subviscidus	B
Endogone acrogena	B
Endogone oregonensis	B
Entoloma nitidum (Rhodocybe nitida)	B
Fayodia bisphaerigera (Fayodia gracilipes)	B
Fevansia aurantiaca (Alpova sp. nov. # Trappe 1966) (*Alpova aurantiaca*)	B
Galerina atkinsoniana	B
Galerina cerina	B
Galerina heterocystis	E
Galerina sphagnicola	E
Gastroboletus imbellus	B
Gastroboletus ruber	B
Gastroboletus subalpinus	B
Gastroboletus turbinatus	B
Gastroboletus vividus (*Gastroboletus* sp. nov. #Trappe 2897; *Gastroboletus* sp. nov. #Trappe 7515)	B
Gastrosuillus amaranthii (*Gastrosuillus* sp. nov. #Trappe 9608)	E
Gastrosuillus umbrinus (*Gastroboletus* sp. nov. #Trappe 7516)	B
Gautieria magnicellaris	B
Gautieria otthii	B
Gelatinodiscus flavidus	B
Glomus radiatus	B
Gomphus bonarii	B
Gomphus clavatus	B
Gomphus kauffmanii	E
Gymnomyces abietis (*Gymnomyces* sp. nov. #Trappe 1690, 1706, 1710; *Gymnomyces* sp. nov. #Trappe 4703, 5576; *Gymnomyces* sp. nov. #Trappe 5052; *Gymnomyces* sp. nov. #Trappe 7545; *Martellia* sp. nov. #Trappe 1700; *Martellia* sp. nov. #Trappe 311; *Martellia* sp. nov. #Trappe 5903)	B
Gymnomyces nondistincta (*Martellia* sp. nov. #Trappe 649)	B

Table 1-1. Species Included in Survey and Manage Standards and Guidelines and Category Assignment (June 2002)	
TAXA GROUP ***Species*** <u>*Note*</u>: Where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses) is name used in NFP (Table C-3).	**Category**
Gymnopilus punctifolius, In California	B
Gyromitra californica	B
Hebeloma olympianum (Hebeloma olympiana)	B
Helvella crassitunicata	B
Helvella elastica	B
Hydnotrya inordinata (*Hydnotrya* sp. nov. #Trappe 787, 792)	B
Hydnotrya subnix (Hydnotrya subnix sp. nov. #Trappe 1861)	B
Hydropus marginellus (Mycena marginella)	B
Hygrophorus caeruleus	B
Hygrophorus karstenii	B
Hygrophorus vernalis	B
Hypomyces luteovirens	B
Leucogaster citrinus	B
Leucogaster microsporus	B
Macowanites chlorinosmus	B
Macowanites lymanensis	B
Macowanites mollis	B
Marasmius applanatipes	B
Martellia fragrans	B
Martellia idahoensis	B
Mycena hudsoniana	B
Mycena overholtsii	D
Mycena quinaultensis	B
Mycena tenax	B
Mythicomyces corneipes	B
Neolentinus adhaerens	B
Neolentinus kauffmanii	B
Nivatogastrium nubigenum, In entire range except OR Eastern Cascades and CA Cascades Physiographic Provinces	B
Octavianina cyanescens (*Octavianina* sp. nov. #Trappe 7502)	B
Octavianina macrospora	B
Octavianina papyracea	B
Otidea leporina	D
Otidea smithii	B
Phaeocollybia attenuata	D
Phaeocollybia californica	B
Phaeocollybia dissiliens	B
Phaeocollybia fallax	D
Phaeocollybia gregaria	B
Phaeocollybia kauffmanii	D
Phaeocollybia olivacea, In Oregon	F
Phaeocollybia olivacea In Washington and California	E
Phaeocollybia oregonensis (syn. *Phaeocollybia carmanahensis*)	B
Phaeocollybia piceae	B
Phaeocollybia pseudofestiva	B
Phaeocollybia scatesiae	B

Table 1-1. Species Included in Survey and Manage Standards and Guidelines and Category Assignment (June 2002)	
TAXA GROUP *Species* — *Note*: Where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses) is name used in NFP (Table C-3).	**Category**
Phaeocollybia sipei	B
Phaeocollybia spadicea	B
Phellodon atratus (Phellodon atratum)	B
Pholiota albivelata	B
Podostroma alutaceum	B
Polyozellus multiplex	B
Pseudaleuria quinaultiana	B
Ramaria abietina	B
Ramaria amyloidea	B
Ramaria araiospora	B
Ramaria aurantiisiccescens	B
Ramaria botryis var. *aurantiiramosa*	B
Ramaria celerivirescens	B
Ramaria claviramulata	B
Ramaria concolor f. marrii	B
Ramaria concolor f. tsugina	B
Ramaria conjunctipes var. *sparsiramosa (Ramaria fasciculata* var. *sparsiramosa)*	B
Ramaria coulterae	B
Ramaria cyaneigranosa	B
Ramaria gelatiniaurantia	B
Ramaria gracilis	B
Ramaria hilaris var. *olympiana*	B
Ramaria largentii	B
Ramaria lorithamnus	B
Ramaria maculatipes	B
Ramaria rainierensis	B
Ramaria rubella var. *blanda*	B
Ramaria rubribrunnescens	B
Ramaria rubrievanescens	B
Ramaria rubripermanens In Oregon	D
Ramaria rubripermanens In Washington and California	B
Ramaria spinulosa var. *diminutiva* (*Ramaria spinulosa*)	B
Ramaria stuntzii	B
Ramaria suecica	B
Ramaria thiersii	B
Ramaria verlotensis	B
Rhizopogon abietis	B
Rhizopogon atroviolaceus	B
Rhizopogon brunneiniger	B
Rhizopogon chamaleontinus (*Rhizopogon* sp. nov. #Trappe 9432)	B
Rhizopogon ellipsosporus (*Alpova* sp. nov. # Trappe 9730)	B
Rhizopogon evadens var. *subalpinus*	B
Rhizopogon exiguus	B
Rhizopogon flavofibrillosus	B
Rhizopogon inquinatus	B
Rhizopogon truncatus	D

Table 1-1. Species Included in Survey and Manage Standards and Guidelines and Category Assignment (June 2002)	
TAXA GROUP <u>*Note*</u>: Where taxon has more than one name indicated, first name is current ***Species*** accepted name, second one (in parentheses) is name used in NFP (Table C-3).	**Category**
Rhodocybe speciosa	B
Rickenella swartzii (Rickenella setipes)	B
Russula mustelina	B
Sarcodon fuscoindicus	B
Sedecula pulvinata	B
Sowerbyella rhenana (Aleuria rhenana)	B
Sparassis crispa	D
Spathularia flavida	B
Stagnicola perplexa	B
Thaxterogaster pavelekii (*Thaxterogaster* sp. nov. #Trappe 4867, 6242, 7427, 7962, 8520)	B
Tremiscus helvelloides	D
Tricholoma venenatum	B
Tricholomopsis fulvescens	B
Tuber asa (*Tuber* sp. nov. #Trappe 2302)	B
Tuber pacificum (*Tuber* sp. nov. #Trappe 12493)	B
Tylopilus porphyrosporus (Tylopilus pseudoscaber)	D
LICHENS	
Bryoria pseudocapillaris	A
Bryoria spiralifera	A
Bryoria subcana (syn. *Alectoria subcana*)	B
Bryoria tortuosa, In WA Olympic Peninsula, WA Western Lowlands, OR Willamette Valley Physiographic Provinces ; CA	A
Bryoria tortuosa, In WA Eastern Cascades, OR Eastern Cascades, OR Klamath Physiographic Provinces, Jackson County, OR	D
Buellia oidalea	E
Calicium abietinum	B
Calicium adspersum	E
Calicium glaucellum	F
Calicium viride	F
Cetrelia cetrarioides	E
Chaenotheca chrysocephala	B
Chaenotheca ferruginea	B
Chaenotheca furfuracea	F
Chaenotheca subroscida	E
Chaenothecopsis pusilla (syn. *Chaenothecopsis subpusilla*, *Calcium asikkalense*, *Calcium floerkei, Calcium pusillum, Calcium subpusillum)*	E
Cladonia norvegica	B
Collema nigrescens, In WA and OR, except in OR Klamath Physiographic Province	F
Dendriscocaulon intricatulum In Coos, Douglas, Curry, Josephine, & Jackson Counties, OR; CA	E
Dendriscocaulon intricatulum In the rest of Oregon and all of Washington	A
Dermatocarpon luridum	E
Heterodermia sitchensis	E
Hypogymnia duplicata (syn. *Hypogymnia elongata*)	A
Hypogymnia vittata (Hygomnia vittiata)	E
Hypotrachyna revoluta (syn. *Parmelia revoluta*)	E
Leptogium burnetiae var. hirsutum	E

Table 1-1. Species Included in Survey and Manage Standards and Guidelines and Category Assignment (June 2002)	
TAXA GROUP *Species* <u>*Note*</u>: Where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses) is name used in NFP (Table C-3).	**Category**
Leptogium cyanescens	A
Leptogium rivale	E
Leptogium teretiusculum	E
Lobaria linita	A
Lobaria oregana, In California	A
Microcalicium arenarium	B
Nephroma bellum, In OR; Klamath, Willamette Valley, Eastern Cascades; WA; Western Cascades (outside GPNF), Eastern Cascades, Olympic Peninsula Physiographic Provinces	E
Nephroma isidiosum	E
Nephroma occultum	A
Niebla cephalota (syn. *Desmazieria cephaolta, Ramalina cephalota*)	A
Pannaria rubiginosa	E
Pannaria saubinetii	F
Peltigera pacifica	E
Platismatia lacunose	C
Pseudocyphellaria sp. 1 (*Pseudocyphellaria mougeotiana*)	B
Pseudocyphellaria rainierensis	A
Pyrrhospora quernea (syn. *Lecidea quernea, Protoblastenia quernea*)	E
Ramalina pollinaria	E
Ramalina thrausta	A
Stenocybe clavata	E
Teloschistes flavicans	A
Tholurna dissimilis, south of Columbia River	B
Usnea hesperina	E
Usnea longissima, In California and in Curry, Josephine, and Jackson Counties, Oregon	A
Usnea longissima, In Oregon, except in Curry, Josephine, and Jackson Counties and in Washington	F
BRYOPHYTES	
Brotherella roellii	E
Buxbaumia viridis, In California	E
Diplophyllum albicans	F
Diplophyllum plicatum	B
Encalypta brevicolla v. crumiana	B
Herbertus aduncus	E
Iwatsukiella leucotricha	B
Kurzia makinoana	B
Marsupella emarginata v. aquatica	B
Orthodontium gracile	B
Ptilidium californicum, In California	A
Racomitrium aquaticum	E
Rhizomnium nudum	B
Schistostega pennata	A
Tetraphis geniculata	A
Tritomaria exsectiformis	B
Tritomaria quinquedentata	B
VERTEBRATES	

Table 1-1. Species Included in Survey and Manage Standards and Guidelines and Category Assignment (June 2002)	
TAXA GROUP *Note*: Where taxon has more than one name indicated, first name is current ***Species*** accepted name, second one (in parentheses) is name used in NFP (Table C-3).	**Category**
Larch Mountain salamander *Plethodon larselli*	A
Shasta salamander *Hydromantes shastae*	A
Siskiyou Mountains salamander *Plethodon stormi*, In North Range	D
Siskiyou Mountains salamander *Plethodon stormi*, Outside North Range	C
Van Dyke=s salamander *Plethodon vandykei*, Cascade population only	A
Great Gray Owl *Strix nebulosa*	C
Oregon Red Tree Vole *Arborimus longicaudus*, In Central Range)	D
Oregon Red Tree Vole *Arborimus longicaudus*, Outside Central Range)	C
MOLLUSKS	
Ancotrema voyanum	E[3,4]
Cryptomastix devia	A
Cryptomastix hendersoni	A
Deroceras hesperium	B[4]
Fluminicola n. sp. 3	A[2]
Fluminicola n. sp. 11	A[2]
Fluminicola n. sp. 14	A
Fluminicola n. sp. 15	A
Fluminicola n. sp. 16	A
Fluminicola n. sp. 17	A
Fluminicola n. sp. 18	A
Fluminicola n. sp. 19	A[2]
Fluminicola n. sp. 20	A[2]
Fluminicola seminalis	A[2]
Helminthoglypta hertleini	E[4]
Helminthoglypta talmadgei	D
Hemphilla burringtoni	E
Hemphillia glandulosa, In WA Western Cascades Physiographic Province	E
Hemphillia malonei, Washington	C
Hemphillia pantherina	B
Juga (O) n. sp. 2	A
Juga (O) n. sp. 3	A
Lyogyrus n. sp. 1	A
Lyogyrus n. sp. 2	A
Lyogyrus n. sp. 3	A
Megomphix hemphilli, South of south boundary of Lincoln, Benton, and Linn Counties, Oregon	F[5]
Megomphix hemphilli, North of south boundary of Lincoln, Benton, and Linn Counties, Oregon	A
Monadenia chaceana	B[4]
Monadenia fidelis klamathica	B[3,4]
Monadenia fidelis minor	E
Monadenia fidelis ochromphalus	B[3,4]
Monadenia troglodytes troglodytes	A
Monadenia troglodytes wintu	A
Oreohelix n. sp.	A
Pristoloma articum crateris	B[2,4]
Prophysaon coeruleum, In California and Washington	A
Trilobopsis roperi	A

Table 1-1. Species Included in Survey and Manage Standards and Guidelines and Category Assignment (June 2002)	
TAXA GROUP <u>*Note*</u>: Where taxon has more than one name indicated, first name is current ***Species*** accepted name, second one (in parentheses) is name used in NFP (Table C-3).	**Category**
Trilobopsis tehamana	A
Vertigo n. sp.	A
Vespericola pressleyi	A
Vespericola shasta	A
Vorticifex n. sp. 1	E
VASCULAR PLANTS	
Arceuthobium tsugense mertensianae, In Washington only	F
Bensoniella oregana, In California only	A
Botrychium minganense, In Oregon and California	A
Botrychium montanum	A
Coptis asplenifolia	A
Coptis trifolia	A
Corydalis aquae-gelidae	C
Cypripedium fasciculatum, Entire Range	C
Cypripedium montanum, Entire range except Washington Eastern Cascades Physiographic Province	C
Eucephalus vialis (Aster vialis)	A
Galium kamtschaticum, Olympic Peninsula, WA Eastern Cascades, OR & WA Western Cascades Physiographic Provinces, south of Snoqualmie Pass	A
Platanthera orbiculata var. *orbiculata* (*Habenaria orbiculata*)	C
ARTHROPODS	
Canopy herbivores (south range)	F
Coarse wood chewers (south range)	F
Litter and soil dwelling species (south range)	F
Understory and forest gap herbivores (south range)	F

[1] Although Pre-Disturbance Surveys are deemed practical for these species, continuing pre-disturbance surveys is not necessary in order to meet management objectives.

[2] For these species, until Management Recommendations are written, the following language will be considered part of the Management Recommendation: AKnown and newly discovered sites of these species will be protected from grazing by all practical steps to ensure that the local population of the species will not be impacted.@

[3] For these species, until Management Recommendations are written, the language Aknown and newly discovered sites of these species will be protected from grazing by all practical steps to ensure that the local population of the species will not be impacted@ is the Management Recommendation and no other recommendations are imposed at this time.

[4] Based upon direction contained in the ROD, equivalent-effort pre-disturbance surveys are required for these eight mollusk species.

[5] Based upon direction contained in the ROD, these two mollusk species require management of sites known as of 9/30/99.

Appendix J

Table 1-2. Species Removed from Survey and Manage, Protection Buffers, and Protect from Grazing in All or Part of Their Range (June 2002)			
TAXA GROUP *Species*	*Note: where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses is name used in NFP (Table C-3)*	**1994 NFP Category**	**2001 ROD Category**
FUNGI			
Albatrellus fletti, in Oregon[2]			B
Bondarzewia mesenterica, In Oregon[2]			B
Bryoglossum gracile[1]		1,3	
Cantharellus cibarius		3,4	
Cantharellus formosus		1,3	
Cantharellus subalbidus, In Oregon			D
Chromosera cyanophylla[1]			B
Clavariadelphus borealis		3,4	
Clavariadelphus lovejoyae		3,4	
Clavicorona piperata (*Clavicorona avellanea*)		3	
Clavulina cinerea		3,4	
Clavulina cristata (*Clavulina cinerea*)		3,4	
Cordyceps capitata[1]			B
Craterellus tubaeformis (*Cantharellus tubaeformis*), In Oregon[2]			D
Galerina vittiformis (*Galerina vittaeformis*)[3]			B
Gomphus floccosus, In Oregon and Washington		3	
Gomphus floccosus			F
Gymnopilus punctifolius, In Oregon and Washington[2]			B
Gyromitra esculenta			F
Gyromitra infula[1]			B
Gyromitra melaleucoides[1]			B
Gyromitra montana			F
Helvella compressa		1,3	
Helvella maculata			B
Hydnum repandum		3	
Hydnum umbilicatum			B
Martellia maculata (*Elaphomyces* sp. nov. #Trappe 1038)		1,3	
Martellia monticola		1,3	
Mycena monticola[1]			B
Neournula pouchetti			B
Nivatogastrium nubigenum, In Oregon, E. Cascades; California, Cascades[2]			B
Omphalina ericetorum (*Phytoconis ericetorum*)		3,4	
Otidea onotica			F
Phaeocollybia carmanahensis		1,3	
Pithya vulgaris			D
Plectania melastoma			F
Plectania milleri			B
Rhizopogon parksii (*Rhizopogon* sp. nov. #Trappe 1692; *Rhizopogon* sp. nov. #Trappe 1698)		1,3	
Sarcodon imbricatus			B
Sarcosoma latahense			B
Sarcosoma mexicanum, All of Oregon, except Curry and Josephine Counties[2]		3, PB	
Sarcosoma mexicanum			F
Sarcosphaera coronaria (*Sarcosphaera eximia*)			B

Table 1-2. Species Removed from Survey and Manage, Protection Buffers, and Protect from Grazing in All or Part of Their Range (June 2002)			
TAXA GROUP *Species*	*Note: where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses is name used in NFP (Table C-3)*	**1994 NFP Category**	**2001 ROD Category**
Thaxterogaster pingue		3	
LICHENS			
Calicium adaequatum[1]		4	
Chaenotheca brunneola[1]		4	
Collema nigrescens, In OR Klamath; CA Klamath, and Coast Physiographic Provinces[2]		4	
Cyphelium inquinans[1]		4	
Erioderma sorediatum[1]		1,3	
Heterodermia leucomelos (syn. *Anaptychia leucomelaena, Heterodermia leucomelaena*)[1]		1,3	
Hydrothyria venosa		1,3	
Hypogymnia oceanica			F
Kaernefeltia californica (*Cetraria californica*)[1]		1,3	
Leioderma sorediatum[1]		1,3	
Leptogium brebissonii[1]		1,3	
Leptogium saturninum[1]		4	
Lobaria hallii		1,3	
Lobaria oregana, In Oregon an dWashington[2]		4	
Lobaria pulmonaria		4	
Lobaria scrobiculata		4	
Loxosporopsis corallifera (*Loxospora* sp. nov. "*corallifera*")		1,3	
Mycocalicium subtile[1]		4	
Nephroma bellum, In Oregon, W. Cascades and Coast Range; In Washington, W. Cascades (GPNF only)[2]			F
Nephroma helveticum		4	
Nephroma laevigatum		4	
Nephroma parile		4	
Nephroma resupinatum		4	
Pannaria leucostictiodes		4	
Pannaria mediterranea		4	
Peltigera collina		4	
Peltigeria neckeri[1]		4	
Pilophorus nigricaulis[1]		1,3	
Pseudocyphellaria anomala		4	
Pseudocyphellaria anthraspis		4	
Pseudocyphellaria crocata		4	
Stenocybe major[1]		4	
Sticta arctica[1]		1,3	
Sticta beauvoisii		4	
Sticta fuliginosa		4	
Sticta limbata		4	
Tholurna dissimilis, North of Columbia River[2]		1,3	
BRYOPHYTES			
Antitrichia curtipendula		4	
Bartramiopsis lescurii[1]		1,3	
Buxbaumia viridis, In Oregon and Washington[2]			D

Table 1-2. Species Removed from Survey and Manage, Protection Buffers, and Protect from Grazing in All or Part of Their Range (June 2002)

TAXA GROUP *Species*	*Note: where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses is name used in NFP (Table C-3)*	**1994 NFP Category**	**2001 ROD Category**
Douinia ovata[1]		4	
MOLLUSKS			
Fuminicola n sp. 1 (1)			A
Fuminicola n. sp. 2 (1)			A
Hemphillia glandulosa, In WA, Olympic Peninsula; In Oregon, Coast Range (2)			C
Hemphillia malonei, In Oregon (2)			C
Monadenia churchi			F
Prophysaon coeruleum, In Oregon[2]		1,2	
Prophysaon dubium		1,2	
Vorticefex klamathensis sinitsini (1)			E
VASCULAR PLANTS			
Allotropa virgata		1,2	
Botrychium minganense, In Washington[2]		1,2	
Clintonia andrewsiana		1,2	
Cypripedium montanum, In Washington, Eastern Cascades (2)			C
Galium kamtschaticum, WA Western Cascades Physiographic Province, north of Snoqualmie Pass[2]		1,2	
Pedicularis howellii[1]		1,2,PG	
Scoliopus bigelovii		1,2	

[1]These species are already on, or are currently being considered for, the Agencies' special status species programs. Known sites for these species will be managed until their disposition is clarified in the special status species consideration.

[2]These species are removed from only part of their range in the Northwest Forest Plan Area.

[3]This fungus generally appears under the name vittaeformis. According to the International Code of Botanical Nomenclature (Art. 73.8) this epithet has been formed in the incorrect manner; the correct form is vittiformis

Note: Where taxa has two names, first name is current accepted name and second one in parentheses is name used in Northwest Forest Plan (Table C-3).

Abbreviations: NFP= Northwest Forest Plan PB= Protection Buffer
PG=Protect From Grazing

APPENDIX K: NEPA IMPACTS ANALYSIS for LISTED TERRESTRIAL WILDLIFE SPECIES
SALEM BLM-MARYS PEAK RESOURCE AREA

ACTION: LITTLE BOULDER AMA COMMERCIAL THIN/DENSITY MANAGEMENT PROJECT				
TAXA / **Species**	**SSS**	**SAS**	**Concern (Yes/No)**	**Species status as of: April 2003** / **Rationale**
INVERTEBRATES				
All Mollusks in RR		RR	No	1. No-cut buffers (aver. 75ft), post-harvest leave tree buffers (76-200ft), and protection of existing snags and coarse woody debris will maintain enough structure &canopy closure (>50%) to protect microclimates and nesting/foraging resting/escape habitats w/i the riparian reserves.
American Acetropis Grass Bug ***Acetropis americana***	BS		No	2. No known sites on BLM; intimately associated with tufted hairgrass (*Deschampsia cespitosa*); suitable habitat on BLM may occur on low elevation wet/dry meadows, oak savannah, or grassy openings/balds which are all small, isolated, and highly fragmented patches.
Fender's Blue Butterfly ***Icaricia icarioides fenderi***	FE		No	3. No known sites on BLM; known to occur at OSU MacDonald Forest; larvae feed on Kincaid's lupine; see 2. above for suitable habitat on BLM.
Haddock's Rhyacophilan Caddisfly ***Rhyacophila haddocki***	BS		No	4. One known site (Marys Pk); Aquatic Conservation Strategy will provide the water/riparian quality necessary to maintain viable aquatic macro-invertebrate populations.
Oregon Giant Earthworm ***Driloleirus macelfreshi***	BS		No	5. No known sites on BLM; live in deep, moist, undisturbed soils of riparian forests, most known sites in Willamette Va.; see 1. above.
Oregon Megomphix Snail ***Megomphix hemphilli***		SM	No	6. Project was surveyed to protocol with no detections of this species.
Roth's Blind Ground Beetle ***Pterostichus rothi***	BS		No	7. Four known sites (top of Marys Pk , 3 mi. east of Lincoln City, Grass Mt., & Alsea Fish Hatchery); prefers cool-cold, moist, well drained, deep, coarse-crumb soils, under closed canopy conifer forest; entire life-cycle below soil surface, burrows deep during warm, dry periods.
Taylor's Checkerspot Bttrfly ***Euphydryas editha taylori***	BS		No	8. No known sites on BLM; only known site in OR on grassy bald in OSU MacDonald Forest; larvae feed on grasses, esp. *Festuca spp;* see 2. above for suitable habitat on BLM.
American Peregrine Falcon ***Falco peregrinus anatum***	SE/BS		No	9. No known nest sites on BLM in R.A., best cliff-type nesting habitat occurs along coast, in Portland, and in Columbia Gorge.

ACTION: LITTLE BOULDER AMA COMMERCIAL THIN/DENSITY MANAGEMENT PROJECT				
TAXA **Species**	**SSS**	**SAS**	**Concern (Yes/No)**	**Species status as of: April 2003** **Rationale**
BIRDS				
Bald Eagle ***Haliaeetus leucocephalus***	FT		No	10. One breeding pair on BLM (Va. of the Giants); no known sites in or adjacent to the action area.
Cassin's Auklet ***Ptychoramphus aleuticus***	BA		No	11. No known sites on BLM; nesting habitat occurs at Yaquina Head ONA but breeding has not been confirmed; all nesting habitat is fenced and protected.
Harlequin Duck ***Histrionicus histrionicus***	BA		No	12. No known breeding populations in RA; occasional pairs seen during breeding season on Coast Range rivers, see 1. above.
Marbled Murrelet ***Brachyramphus marmoratus***	FT		No	13. No suitable habitat in or adjacent to project area. Closest patch of habitat 3 miles to east. Closest occupied site 3 miles to northwest.
Northern Goshawk ***Accipiter gentilis***	BS		No	14. No known sites on BLM; rare to very rare west of the Cascades, no known breeding populations in the Coast Range.
Northern Spotted Owl ***Strix occidentalis caurina***	**FT**		**Yes**	**15. Thinning may affect the quality of dispersal habitat. Refer to Biological Evaluation for more details.**
Oregon Vesper Sparrow ***Pooecetes gramineus affinis***	BS		No	16. No known sites on BLM; prefers open areas within or adjacent to oak savannah or open mixed conifer/hardwood forests; not a conifer forest species.
Purple Martin ***Progne subis***	BS		No	17. Known to occur on BLM lands; prefers large snags within early-seral (0-39 years) habitat.
Rhinoceros Auklet ***Cerorhinca monocerata***	BA		No	18. Known to occur at Yaquina Head Outstanding Natural Area. All known and potential nesting habitat is fenced and protected.
MAMMALS				
All Bats in RR		RR	No	19. See 1. above.
American Marten ***Martes americana***		RR	No	20. No known sites on BLM; rare in the north half of the Coast Range; see 1. above; leave trees and coarse woody debris may provide suitable dispersal habitat in the uplands.
Fringed Myotis ***Myotis thysanodes***	BA	RR/ BRS	No	21. Expected to occur on BLM; see 1. above; leave trees, snags, stumps, and coarse woody debris is expected to provide suitable nesting and foraging habitats in the uplands; no known abandoned wooden bridges or buildings in or adjacent to the action area.
Long-Eared Myotis ***Myotis evotis***		RR/ BRS	No	22. See 21. above.

ACTION: LITTLE BOULDER AMA COMMERCIAL THIN/DENSITY MANAGEMENT PROJECT				
TAXA	**SSS**	**SAS**	**Concern (Yes/No)**	**Species status as of: April 2003**
Species				**Rationale**
Long-Legged Myotis *Myotis volans*		RR/ BRS	No	23. See 21. above.
Pacific Fisher *Martes pennanti pacifica*	BS		No	24. See 20. above.
Red Tree Vole *Arborimus longicaudus*		RR/ SM	No	25. The stand was surveyed to protocol and six trees with nest structures were climbed. No active red tree vole nests were found..
Silver-Haired Bat *Lasionycteris noctivagans*		RR/ BRS	No	26. See 21. above.
Townsend's Big-Eared Bat *Corynorhinus townsendii townsendii*	BS	RR/ BRS	No	27. No known sites on BLM; no known caves, mines, or cave-like structures on BLM in the RA.
Yuma Myotis *Myotis yumanensis*		RR/ BRS	No	28. See 21. above.
AMPHIBIANS				
All Amphibians in RR		RR	No	29. See 1. above.
N. Red-Legged Frog *Rana aurora aurora*	BA	RR	No	30. Known to occur on BLM lands; see 1. above; leave trees and coarse woody debris is expected to provide suitable dispersal habitat in the uplands.
Tailed Frog *Ascaphus truei*	BA	RR	No	31. Known to occur on BLM lands; see 30. above.
REPTILES				
Western Painted Turtle *Chrysemys picta bellii*	BS		No	32. No known sites on BLM; prefers marshes, slow rivers, ponds and lakes with large amounts of aquatic vegetation and with a muddy or sandy substrate.
Western Pond Turtle *Clemmys marmorata marmorata*	BS		No	33. No known sites on BLM; rare in the Willamette Va. north of Eugene; prefer marshes, ponds, lakes, and quiet rivers with large amounts of emergent logs or boulders for aggregate basking.

SSS=Special Status Species in order of priority:

- *Endangered Species Act Listings:* **FE**=Federal Endangered; **FT**=Federal Threatened; **FPE**=Federal Proposed Endangered; **FPT**=Federal Proposed Threatened; **FC**=Federal Candidate Species
- *Oregon Dept. of Fish & Wildlife Listings:* **SE**=State Endangered; **ST**=State Threatened
- *BLM Listings:* **BS**=Bureau Sensitive
- *OR/WA BLM State Office Listings:* **BA**=Bureau Assessment

SAS=Special Attention Species:

- *Northwest Forest Plan Listings:* **RR**=Riparian Reserve Species; **SM**=Survey & Manage Species; BRS=Bat Roost Site Species

Concern

No: No substantial impact(s) to the species or its habitat from the proposed action, no further evaluation in EIS/EA is necessary;

Yes: Impact(s) to species or its habitat occur and further evaluation is necessary in the environmental analysis

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